ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF COMMERCIAL FISHERIES

ANNUAL MANAGEMENT REPORT

1976

KUSKOKWIM DISTRICT

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PREFACE

This report presents all available information concerning the management of commercial and subsistence fisheries in the Kuskokwim district. Although data from many special research projects are included in this report, complete documentation of these projects and results will be presented in separate reports. All catch data tables are based upon field data.

Data presented in this report supercedes information found in previous management reports. An attempt has been made to correct errors in previous reports and previously unrecorded data have been incorporated into this report which are so indicated by appropriate footnotes.

This report is organized into the following major sections:

1. District Introduction. This is a general and brief description of the area, inhabitants, fishery resources, fisheries and management practices.
2. District Summary. This section summarizes current year data for the area and makes comparisons with previous years.
3. Subdistrict Reports. There are several unique and separate fisheries in the district and separate comprehensive reports are presented for each.

In order to facilitate use of this report, the tabular data has been separated into current year tables and appendix tables where annual comparisons are made. The text for each major section is followed by current year tables and then appendix tables.

The following is an explanation of how effort and catch per unit effort data, presented throughout this report, have been derived. Total boat (or fisherman) hours are computed by arbitrarily assuming that if a fishing boat delivers in any 24 hour fishing period, it fished the

entire period. If the period was more than 24 hours long, then the vessel is assumed to have fished the complete period for as many hours as was open to commercial fishing.

Catch per fisherman (or boat) hour is obtained by dividing the total fisherman hours into the catch for the corresponding period of time.

Total fishermen (or boats) is the total number of fishermen making deliveries, irrespectively of how many deliveries made or days fished during a particular "season". There are a number of fishermen who deliver only once or twice during the entire season.

"Total days fished" is the total number of hours open for commercial fishing during the season divided by 24.

Commercial catch information presented for the current year is derived from field data and not from finalized computer tabulations. Commercial catch data through 1975 are derived from final computor tabulations.

KUSKOKWIM DISTRICT

INTRODUCTION

District and Subdistrict Boundaries

The Kuskokwim district includes all waters of the Kuskokwim River drainage and all water of Alaska between Cape Newenham and Cape Romanzof. The present commercial salmon fishing area is divided into four subdistricts: subdistrict 1 (lower Kuskokwim River from Eek Island to Mishevik Slough below Tuluksak); subdistrict 2 (middle Kuskokwim River from Mishevik Slough to the Kolmakoff River near Aniak); subdistrict 4 (approximately five miles of shoreline adjacent to the village of Quinhagak); and subdistrict 5 (Goodnews Bay). Subdistrict 3 (upper Kuskokwim River above the Kolmakoff River) has been closed to commercial fishing since 1966 (Figure 1). Table 1 shows the relative distances, in river miles, from three sites on the Kuskokwim River to various locations in the district.

Fishery Resources

All five species of Pacific salmon are indigenous to the district: i.e. chinook or "king" salmon (Oncorhynchus tshawytscha), sockeye or "red" salmon (O. nerka), coho or "silver" salmon (O. kisutsch), pink salmon or "humpback" (O. gorbuscha) and chum or "dog" salmon (O. keta). The largest population of kings, chums and cohos are found in the Kuskokwim River drainage, while reds and pinks are more numerous in the Kanektok and Goodnews Rivers.

Other important species common to the district include: inconnu or "sheefish" (Stenodus leucichthys) several species of whitefish and cisco (Coregonus sp.), Alaska blackfish (Dallia pectoralis), northern pike (Esox lucius) and burbot or "lush" (Lota lota). Additional species are listed in Table 2.

Commercial Fishery

Although the Kuskokwim district commercial fishery is the oldest in the AYK region with catches reported as early as 1913, commercial fishing did not mature for a half-century. For many years, small commercial mild-cure operations were conducted in or near Kuskokwim Bay while the Kuskokwim River fishery remained virtually undeveloped. During the 1930's when dog teams were intensely utilized for freight hauling, a "quasi-commercial" fishery operated in the McGrath area for the sale of dried, subsistence caught salmon for dog food. However, this fishery declined with the dog teams and the Kuskokwim district experienced little additional commercial effort until Alaska became a state more than twenty years later.

Commercial salmon fishing activity has grown significantly since statehood as district fishermen have been making the difficult transition from a subsistence culture to a cash economy. This has affected fishing effort, resulting in a tremendous expansion in fishermen numbers and in increased, sustained effort. Fishing vessels have remained virtually unchanged over the years, but increased utilization of highly mobile nylon drift nets has greatly improved the efficiency of the fleet. Of course, the overall expansion of the commercial fishery could not have been accomplished without improvements in processing and tendering facilities that have occurred throughout the district (Appendix Table 1).

King, red, coho, pink and chum salmon are of primary commercial significance in the Kuskokwim district. Although these fish are commercially utilized locally to some extent, the vast majority are transported from the district as a fresh or frozen product. Sheefish and whitefish are harvested incidentally to the salmon catch, however, a limited fall and

winter "whitefish fishery" is conducted to satisfy local market requirements.

Subsistence Fishery

District residents have long depended upon the fishery resources as a source of food. Until relatively recently, traditional fishing methods and materials limited the size and scope of the fishery. Spears, dip nets, fish traps, and willow or caribou strip gill nets were slowly supplanted by more efficient linen gill nets enabling the fishery to expand tremendously. Whitefish, cisco, black fish, pike, burbot, and sheefish have been historically utilized along with salmon, particularly chum salmon. Recent improvements in fishing gear, notably the introduction of nylon gill net webbing, have increased the availability and importance of king salmon since statehood. Estimated peak subsistence salmon harvest levels were reached during the 1930's coincidentally with the quasi-commercial McGrath fishery, but harvest trends indicated a continuing decline into the 1940's. Little additional catch data is available for the twenty year span prior to statehood (Appendix Table 1).

Today the dependence on fish for personal use remains as important as money realized from the commercial fishery. However, several factors, as yet not totally defined, are affecting the complexion of the subsistence fishery. These factors include:

(1) Increasing commercialization of subsistence products.

(2) Cultural changes of local residents.

(3) Various State and Federal social-aid programs.

Any management of the Kuskokwim district fishery resources must take into account the growing - and changing - requirements of the subsistence fishery.

Subsistence Salmon Roe Fishery

The Governor approved legislation on May 29, 1975 allowing the sale of subsistence caught salmon roe within the AYK region. In order to administer the legislation, the Commissioner of Fish and Game issued an emergency regulation in June, 1975 which controlled the purchase and sale of subsistence roe in portions of the region. The key elements of the emergency regulation were:

1) Permits are required of all persons or companies purchasing or processing subsistence-caught roe.
2) Revocation of permits upon violation of permit terms, regulations or laws.
3) Strict reporting requirements in regard to amount of subsistence-caught roe in order that estimates of subsistence harvests can be made.
4) Prohibition of subsistence-caught roe sales when subsistence harvests are likely to exceed traditional personal use needs.
5) Prohibition of subsistence-caught roe sales in districts and subdistricts where salmon runs are especially vulnerable to overharvest or where subsistence catches in the past have been negligible.

Numbers of salmon were "back-calculated" from reported subsistence roe poundages by utilizing in-season sampling of the various runs. Therefore, estimates of the subsistence harvest were possible and were available for in-season management purposes. Attachment 1 presents a comprehensive review of the "subsistence roe fishery".

Management

The Division of Commercial Fisheries of the Alaska Department of Fish and Game is responsible for the management of the commercial and

subsistence fisheries within the Kuskokwim district. The permanent staff assigned to this district includes one management biologist and two research biologists. In addition, 10-15 temporary summer employees are hired each season to assist the permanent staff in conducting various management and research studies.

The main objective of the Department's program is to manage the commercial salmon fisheries on a sustained yield basis in addition to obtaining needed information to determine the potential for commercial fisheries on under utilized species such as herring, char and whitefish. Present commercial salmon fishing regulations are still relatively restrictive in order to insure that sufficient salmon are provided for subsistence fishery and spawning ground requirements.

The basic regulation that governs the commercial salmon harvest in all districts is the scheduled weekly fishing period. Commercial fishing is normally allowed from 6 hours to four days a week during the open season, depending upon the sub-district and species involved. Fishing effort usually occurs during the entire run and not just during any particular segment of the run. Occasionally more, or less, fishing time is allowed, depending upon fishing conditions, the strength of the runs or spawning escapements as determined by special studies conducted by the Department.

Due to the vast size of the area and the turbid nature of many streams, accurate estimates of the size of salmon runs and the spawning escapements are difficult to obtain. Fishery management is also hampered by the relative lack of comparative catch and return information since all the fisheries were either initiated or expanded through regulation changes since 1961 and 1962. The management problem is further compounded by having to provide sufficient escapement after commercial fishing for the important subsistence fishery as well as for spawning purposes.

For these reasons the present commercial fishery is still considered to be somewhat experimental in nature. It has been a policy of the Alaska Department of Fish and Game to maintain recent levels of commercial utilization for a few years in order to establish definite trends in subsistence utilization and to obtain more information on the relationship between the salmon catch and return.

If there is no apparent change in run size, it is the Department's policy to increase commercial utilization once trends in declining subsistence utilization can be established. It should be pointed out that increases in commercial fishing effort and efficiency have occurred and may balance any immediate decline in subsistence utilization with the result that present regulations will be maintained or even made more restrictive.

A brief list of emergency orders and regulations promulgated during 1976 is presented in Table 3.

Regulatory changes enacted by the Alaska Board of Fisheries at their December meeting in Soldotna are shown in Table 4.

Table 5 lists special studies undertaken during 1976 and include a summary of objectives and results.

A unique problem in the area is the so-called language barrier. Many of the older native people cannot read or speak English. Therefore, the staff must use translators when conducting the many public meetings that are annually conducted throughout the area. In addition, many special regulation notices are distributed in both the English and Eskimo languages. While it may normally take only half an hour or so to conduct a public meeting or hearing in English, it usually takes two to three times that long when Eskimo translators are used. To assist in the information and education program, a weekly fishery program is

broadcasted over radio KYUK in Bethel. Additionally, the Department contributes to the bi-weekly newspaper, Tundra Drums.

DISTRICT SUMMARY OF THE 1976 COMMERCIAL FISHERIES

Licensing

Recent license registration levels have increased tremendously, although most 1976 totals were slightly below record 1974 levels. Commercial registration increased 0.6% to 1,145 and was 26% above the recent five-year average of 850 licenses. Vessel licenses totaled 826 (9% decrease) or 19% above the 1971-1975 average of 669 licenses. Drift gill net registration dropped to 778 (9% decrease), but represented an increase of 18% above the recent average of 638. Set gill net registration remained low and totaled only 23 licenses, or 55% below the recent five-year average of 51 licenses. Overall, the 1976 registration of 2,772 licenses decreased 6% below record 1974 levels, but remained 20% above recent year average levels (Appendix Table 2).

The Kuskokwim district remains a resident fishery, as 99% of all 1976 gear licensees were residents of the district (Table 7). These fishermen move freely between subdistricts so registration data does not correspond with the total number of fishermen who fished each subdistrict. The total number of fishermen making deliveries at least once in each subdistrict was: 335-10, 674; 335-20, 57; 335-40, 181; and 335-50, 40.

Gear license holders are issued permanent registration numbers which do not change during the life of the individual fishermen. Whenever actual numbers of fishermen are given this report, they refer to data obtained from permanent registration numbers.

Commercial Catches

The 1976 commercial salmon catch of 447,903 was 10% below the record 1974 harvest, but exceeded the previous five-year average of

322,422 fish (Appendix Table 3). Species compostion was: 49,262 kings, 14,636 reds, 112,130 cohos, 39,998 pinks and 231,877 chum salmon (Table 8). Intense fishing effort and a better than average run put the king salmon catch at the highest level since 1973 (Appendix Tables 3 & 4). The chum salmon catch was the largest on record, while the red salmon harvest was the third largest. The coho salmon harvest was the fourth largest ever recorded and the pink salmon catch was typically high for this "even year cycle" species. Commercial catches of all species were strongly influenced by intense, consistently high fishing effort and increased fleet efficiency.

Average 1976 salmon weights are presented in Table 9.

Buyers and Processors

Table 6 includes all buyers and processors that operated during 1976 in the district. Appendix Table 5 compares the 1976 pack to previous years and Appendix Table 6 presents the mean salmon weights and the prices paid to fishermen for the last decade.

Economic Value

Commercial fishermen received approximately $1,380,229 for their catch in 1976 (Appendix Table 7 while a minimum of $175,000 in wages was estimated to have been earned by processing plant employees and tenderboat operators. Prices paid for commercial salmon roe was similar to 1975 levels, and about $300,000 went to subsistence fishermen from the sale of subsistence roe.

Enforcement

The most common violation during the past few seasons has been subsistence fishing during closed periods. In the past, the Department vigorously pursued a program of informing the public of impending closures by utilizing the local radio station, C.B. radio, telephone and by

personal contact. Additionally, in 1976 a two-man crew spent six weeks in the Akiak-Akiachak-Kwethluk area collecting subsistence information and explaining pertinent regulations to fishermen. Violations decreased markedly in this area.

Increasing number of fishermen were observed operating in areas closed to commercial fishing. The boundary at Napakiak in subdistrict 1 was often ignored during the chum salmon fishery, while fishermen were observed more than three miles out of the open commercial area in subdistrict 4 (Quinhagak). Reports persist of illegal fishing in the Goodnews River of subdistrict 5. Continued fishing in closed areas could endanger various salmon runs and result in increased restrictions upon the commercial and subsistence fisheries.

In the past, Public Safety enforcement activities have been characterized by insufficient personnel and equipment to adequately perform their mission. This situation still exists, however, the caliber and attitude of Kuskokwim Protection Officers has improved tremendously.

KUSKOKWIM RIVER (SUBDISTRICTS 1 & 2)

Commercial Fishery

The greatest amount of fishing effort and the largest commercial salmon catches occur within the 108-mile long Kuskokwim River subdistrict 1, (stat. area 335-10). There are 12 villages and at least 15 temporary fish camps located within the boundaries of this subdistrict. A majority of the district residents utilize the fishery resources for both commercial and subsistence purposes.

Set gill nets, drift gill nets and fishwheels are the legal types of commercial gear that can be operated in the Kuskokwim River, although the latter type of gear has not been used for the past several years. The gill nets cannot exceed 50 fathoms in length. After June 25, a six-

inch maximum mesh size restriction is in effect in the commercial chum salmon fishery located below the village of Napakiak.

Lower Kuskokwim River commercial fishermen operate highly mobile drift gill nets. This type of fishing is conducted by laying out 35 to 50 fathoms of gill net from a skiff and then drifting with the river current. Drift net fishing requires a section of river that is relatively free of snags. Set gill nets are not utilized to a great extent by commercial fishermen and are used mainly for subsistence fishing. Commercial set gill nets are fished in small eddies along the banks of the Kuskokwim River and larger eddies out in the main river. Set gillnetting is done with much shorter nets, usually 5 to 15 fathoms in length, which tend to be more poorly constructed than do the drift gill nets.

Although there are no mesh restrictions regarding nets operated in the lower subdistrict through June 25, most nets used during this time consist of 8-1/2 inch stretched mesh webbing. After June 25, a six-inch stretched mesh size limitation is in effect and most nets consist of 5-1/4 - 5-1/2 inch stretched mesh. Depths of king salmon nets range mainly from 28-40 meshes deep, although additional deeper nets (45-60 mesh) are entering the fishery. Nets used to capture the smaller species range from 30-60 meshes deep.

Kuskokwim River skiffs are long and narrow with a high bow. Generally, boats vary from 16 to 32 feet (23-foot average) in length and 2-1/2 - 3 feet in deck width, although wider, more stable vessels are now entering the fishery. Boats are generally poor for fishing as they are unstable, too narrow for a stern roller, and the sides and stern are generally too low to carry too much of a load.

Several important regulations affecting commercial fishing efforts on the Kuskokwim River are:

1) Commercial fishing periods are limited to two 6-hour periods each week during the king and chum salmon seasons. This helps offset the increased effort and efficiency of the fleet and distributes the allowable harvests over a greater portion of the salmon runs.

2) Commercial fishing is allowed only below Napakiak (the lower 72 miles of river) during the "chum salmon season" (June 25 - July 31). Only gill nets of six-inch stretch mesh or less can be operated during this time. Restricting fishing to the lower portion of the subdistrict enhances fish quality, helps prevent excessive harvest and wastage, and allows subsistence demands to be met. The gill net mesh restriction minimizes the capture of king salmon, particularly the larger, more fecund females.

3) Subsistence fishing is prohibited for 24 hours before each commercial fishing period in subdistrict 1 and subdistrict 2 prior to June 25. During the "chum salmon season" (June 25 - July 31), only the lower subdistrict below Napakiak is affected. This regulation reduces the sale of illegal salmon and provides for a more even escapement distribution. It also reduces fish wastage, as subsistence fishermen are required to check their gear at regular intervals throughout the commercial fishing season.

4) After July 31, commercial fishing periods are regulated by emergency order. This allows fishing effort to be regulated according to the magnitude of the variable coho salmon run. It also allows fishing time to be altered to insure maximum fishermen safety during poor weather conditions in August.

A limited commercial fishery is also conducted in the 118 mile long subdistrict 2. Commercial fishermen in this subdistrict are limited to catch quotas of 2,000 king and a combined total of 2,000 red, chum and coho salmon. The majority of commercial catches are taken in the Tuluksak-Kalskag areas, while the remainder of the subdistrict is primarily devoted to subsistence fishing. Set gill nets and fishwheels are all found in this subdistrict, however, set gill netting predominates.

King Salmon: Only since statehood have king salmon stocks been used significantly by Kuskokwim River fishermen. King salmon commercial and subsistence harvests averaged only 56,237 fish for the 10-year period 1960-1969, but increased to 69,799 during 1971-1975. Effort remained high during the 1976 season and total utilization was 88,652 fish (Appendix Table 8); this is the second highest number ever recorded.

Annual commercial catches ranged between 30,000 to 40,000 king salmon from 1968-1972. A guideline harvest was instituted within this range in an attempt to stabilize the fishery until additional data regarding run size and escapement was obtained. The small runs experienced during the past few seasons indicated the 30,000-40,000 harvest range was too optimistic. Commercial harvests since 1974 have ranged from about 19,000-31,000 and the current guideline harvest for the entire river is 22,000 fish during the "king salmon season". A few thousand additional fish are taken during later seasons when fishing is directed on other species.

The "king salmon season" in the lower subdistrict is not opened until subsistence catches indicate the early portion of the king salmon run has reached the Kalskag-Aniak area and relatively good sustained catches are being made at the Department's test fishing site at Kewgooyuk (56 river miles below Bethel). The late opening of the king salmon

season helps to prevent over-harvest of the early run and gives subsistence fishermen an opportunity to begin fishing without interruption from the commercial fishery.

In 1976 the ice on the Kuskokwim River first moved on May 18, and the river was completely free of ice by May 28. The first reported king salmon was caught on June 1.

After two 6 hour fishing periods on June 17 and 21, the commercial king salmon season in subdistrict 1 was closed with a resultant catch of 20,010 kings (Tables 10-12). The subdistrict 2 commercial fishery was opened for 66 hours during June 21-24 when 3,317 kings were taken (Table 13). The commercial king salmon season in subdistrict 1 was not extended for an additional period due to an excessive combined commercial and subsistence catch. On June 24, when the next commercial fishing period would have occurred, the subsistence catch (estimated from roe sales) was 32,000 and when combined with the commercial catch resulted in a combined catch of 54,000. This catch was taken during an approximate 10 day period.

An additional 7,408 king salmon were taken incidentally during the later chum and coho salmon seasons bringing the total commercial harvest to approximately 31,000 fish. This was the greatest commercial catch since 1973 and similar to both the recent 5 and 10 year averages.

Commercial fishing effort during the king salmon season in subdistrict 1 totaled 561 fisherman, a 7.4% decrease from record 1974 levels. Fishermen hours decreased to 5,724, the lowest on record, and the number of equivalent days fished decreased to .5 (Appendix Table 9). Catch per vessel hour figures of 3.5 were the highest ever documented, which is to be expected due to the short season and better than average sized run.

Data from the Department's test fishing site indicated that the king salmon run peaked about June 18 and was above average in magnitude.

Age analysis of commercial catches, test fishing catches and escapement data indicate the run was composed of a substantial number of females. Catches in 1975 were composed of only about 30% females compared to about 50% females this season. (Table 14).

Chum Salmon: Prior to 1971, chum salmon catches represented only fish taken incidentally to the king and coho salmon fisheries. A commercial chum fishery was initiated in 1971 due to several factors:

1) Early subsistence catch estimations during 1924-1943 indicate an average annual catch of 448,000 chum salmon, compared to an average 221,000 chum salmon taken yearly during 1960-1970. This represents a reduction of 227,000 fish per year. This subsistence harvest reduction is believed to have been largely influenced by lessening dependence on subsistence fishing.
2) There is a minimum of 16 known chum salmon spawning tributaries in the Kuskokwim River system. Most of these streams cannot be surveyed annually due to fund limitations and adverse stream or weather conditions. Usually, not more than three tributary streams can be adequately surveyed in any given season, but as many as 185,000 spawning chums have been counted. This indicated a significant chum salmon population.
3) Commercial catches were believed to be able to provide additional information regarding the size, timing and magnitude of the chum salmon run in addition to age, sex and size composition.

Total utilization figures have increased steadily since the inception of the commercial chum salmon fishery with a total of 401,656 fish being caught in 1976. Although this figure is 11 percent below the high 1974

harvest, it is 24 percent above the recent five-year average (Appendix Table 10).

The "chum salmon season" in subdistrict 1 is opened after June 25 below markers placed at the village of Napakiak. Commercial fishermen must use nets of less than 6-inch stretched mesh. The delayed opening dates combined with the mesh restriction minimizes incidental harvests of king salmon, while restricting commercial fishing to the lower portion of subdistrict 1 allows subsistence fishermen to meet their requirements.

The ~~1977~~ 1976 commercial chum salmon season in subdistrict 1 was opened on June 28 and five 6-hour fishing periods were fished until July 15 during which time 170,486 chums were sold (Tables 10-12). This was a record harvest for this season and was 28 percent above the recent five year average. Commercial fishing effort totaled 517 fishermen, 4 percent below the record 1975 level. (Appendix Table 11). Catch per unit effort data for both commercial and test fishing catches were above average.

Coho Salmon: The commercial coho salmon season in subdistrict 1 opened on August 2 with a 24 hour fishing period. Subsequent fishing periods through August 31, when the season was closed, were 48 hours in duration. The resultant catch of 87,889 fish during this season was judged to be average (Tables 10-12). A total of 516 fishermen made at least one delivery during this season which represented an effort similar to the two previous years (Appendix Table 12).

In subdistrict 2 of the Kuskokwim River the coho season opened for 24 hours on August 23. A total of 568 salmon was harvested by 11 fishermen. This brought the "small salmon" catch to 1,705 salmon.

Subsistence Fishery

Methods: The annual survey of the Kuskokwim River subsistence fishery was initiated in 1960. During the early years, the Department utilized "smokehouse counts" to determine total utilization of subsistence-caught fish. In an effort to determine additional timing and magnitude data, the Department began using "subsistence catch calendars" which are distributed to fishermen prior to the fishing season. Subsistence fishermen enter their daily catches of salmon and non-salmon species on the calender. During July and August a Department crew utilizes a cabin skiff to travel more than 360 river miles (Eek to Swift River) to collect catch data from the individual fishermen in addition to recording certain information from non-fishing families. After the river survey is completed, catch questionaries are sent to those fishermen not individually contacted.

In the 1969 Annual Report, a review is presented regarding methods used to obtain subsistence harvest and related information. All subsistence information presented in tabular form in this report, except in Appendix Table 17 represents "expanded data". This includes those families known to have fished but for one reason or another were not personally contacted by the survey crew. Catch data for these families are assumed to be the same as the averages for the particular village and are included in most of the tables.

Reported coho salmon catches are very minimal as the coho salmon run occurs after the survey is completed. Most of the coho salmon catch data is obtained from the return of catch calenders. Prior to 1969, little effort was made to determine the coho salmon harvest. The coho salmon estimates are not included in the comparative catch tables.

Catch and Effort: The Kuskokwim River system's harvest included 57,917 king salmon and 223,792 chum salmon utilized by 672 fishing

families during 1976 (Table 11). The king salmon catch was the largest since 1970 and was 33 percent above the recent 15 year average (Appendix Table 13). The chum salmon harvest was 18 percent below the high 1974 catch, but 8 percent above the recent 16-year average (Appendix Table 14).

In order to evaluate the effect of snowmachines on the subsistence harvest, all fishing families interviewed since 1967 have been checked for the number of snowmachines they owned. The number of families owning snowmachines has more than doubled since 1969 (Appendix Table 15). Average numbers of snowmachines per fishing family during 1967-1975 are shown in Appendix Table 16.

The public relations aspect of the annual subsistence fishery survey is important to the success of the survey itself and the Department's management program. By any method tested, the results of the voluntary contribution of the people of this program are as accurate as the people are capable of giving. The major problem is that many of the fishermen are illiterate and speak only Eskimo and have to relay much of the catch information through their school-age children.

There is still a moderate sale or trading of dried salmon on the Kuskokwim River, but is not documented. People from the coastal delta villages still bring their pokes of seal oil to trade for dried fish. The lower river dried fish are now primarily being used for human consumption.

The use of the fishwheel to capture salmon is slowly disappearing from the Kuskokwim River. Only 8 fishwheels were used along the survey route in 1976, compared to 30 in 1965 and 65 in 1960. The fishwheel is being replaced by the much more mobile gill net, which involves a lot less time and effort to operate. The use of gill nets is a relatively new technique for most Kuskokwim River residents. The efficiency of the two types of gear is difficult to evaluate, as large catches are often made with both. Table 15 presents an overview of all the subsistence data conducted in 1976.

Escapement

Kuskokwim River drainage escapement estimates from aerial surveys have proved difficult and costly to obtain. Varying stream and weather conditions, in addition to pilot and observer skills, often make the data difficult to interpret (Appendix Table 18). Although aerial surveys will be continued for some streams, emphasis will be placed on obtaining accurate escapement figures by use of counting towers or weirs on several "key" spawning tributaries.

All the kuskokwim River aerial survey results for 1976 are presented in Table 12. Escapements of kings, chums and reds were generally above average as documented by aerial survey.

A counting tower has been operated yearly on the Kogrukluk River (Holitna River system) since 1969 (except 1971). The Kogrukluk River crew counted 3,261 kings, 9,170 chums, and 4,433 reds. The chum and red salmon counts were the highest on record, while the king count was average in magnitude.

QUINHAGAK (SUBDISTRICT 4)

Commercial Fishery

The Quinhagak fishery is one of two located south of the Kuskokwim River mouth (Figure 1). This fishery has traditionally been very sporadic due to unstable processing facilities, however, the commercial fishery has stabilized during the past few seasons.

Fishing regulations for this subdistrict are very similar to those found on the Kuskokwim River, except that there are no distinct fishing seasons. Beginning with the 1971 season, the basic fishing period was reduced from two 24-hour periods to two 12-hour periods per week. Commercial fishing is allowed only in Kuskokwim Bay waters. This is necessary to ensure escapement of adequate numbers of salmon up the

narrow Kanektok River. The vast majority of gear operated consists of drift gill nets that are fished at low tide in "gutters" located two to three miles off shore and next to shore at high tide. Most of the fishing takes place near the mouth of the Kanektok River.

The Kanektok River king salmon run is later than that of the Kuskokwim River and for this reason the Quinhagak fishery opening is delayed until mid-June. The delayed opening prevents possible interception of Kuskokwim River fish and aids in preventing overharvest of the king salmon run.

Fishermen were required to use small mesh gear (6-inch stretched mesh or smaller) during the entire commercial fishing season. This was necessary primarily to prevent selective harvesting of the larger, more productive king salmon by the large mesh nets. However, the mesh limitation was also designed to increase harvests of the more abundant "other salmon" species (i.e. red, pink, chum, and coho).

The commercial salmon season was opened on June 21 with two 12-hour fishing periods a week continuing until July 19 when an additional 12-hour period was added to the schedule. (Table 16). A total of 14,110 kings, 6,090 reds, 13,777 cohos, 31,412 pinks and 43,659 chums totalling 109,048 fish was taken. All catches were considerably above the recent 5 year averages with the exception of the red salmon catch (Appendix Table 3). Fishermen were placed on limit for much of the season by one of the major buyers. Commercial fishing effort totaled 181 fishermen, an 8 percent decrease from the record 1974 levels but still above average.

Subsistence Fishery

Accurate comparable subsistence data has been lacking for the Quinhagak subsistence fishery during recent years. However, observation by the staff indicates that dependence on subsistence fishing has not been high. Apparently the greatest amount of fishing effort occurs in

the Kanektok River after the commercial fishing season when mostly coho salmon are taken.

Methods used to tabulate catches made by Quinhagak fishermen were similar to those used for the Kuskokwim River survey. A total of 50 Quinhagak fishing families returning catch calendars reported catching 2,200 kings and 5,950 "other salmon"..

Appendix Table 17 shows comparative catch data for 1967-76.

Escapement

Escapement counts made during various aerial surveys of the Kanektok River system are shown in Table 17. Poor weather conditions frequently hampered aerial surveys in the Quinhagak subdistrict. The king salmon escapement appeared to be at least average in magnitude. Based on comparative catch data, escapement of all other species was probably average also.

GOODNEWS BAY (SUBDISTRICT 5)

Commercial Fishery

Traditionally, the male residents from the villages of Goodnews Bay and Platinum have gone to Bristol Bay each summer to fish or work in the canneries, leaving the women and children home to fish for subsistence purposes. Prior to 1968, there are no records indicating that commercial salmon harvests were ever made in Goodnews Bay. The Department held public meetings in the area during the early 1960's regarding the possibility of initiation of a commercial fishery, but the negative response from village residents plus the absence of salmon buyers precluded this development.

In late August of 1968, the commercial salmon fishing was opened by emergency order in Goodnews Bay. This commercial fishery was created as

a result of a request from area residents and Department surveys, which indicated that a small harvestable supply of salmon was available. The fishery has been sporadic in nature due to inconsistent processing capabilities and inclement weather.

The commercial salmon season was opened June 21. The harvest was composed of 4,417 kings, 5,575 reds, 9,852 cohos, 8,453 pinks and 10,354 chums, totaling 38,651 fish. The king salmon catch was 51 percent above the 1975 harvest and 56 percent above the recent five-year average. Numbers of reds were 40 percent below the 1974 record level but were 22 percent above the recent average. The coho salmon harvest was 54 percent below 1974 record but 6 percent above the five-year average, while the chum salmon harvest was 37 percent below the 1974 record and 36 percent above the recent average. Commercial fishing terminated on September 11 when buyers left the subdistrict (Table 18).

A total of 40 fishermen made commercial landings in 1976, a decrease of 24 fisherman below 1975 levels.

This fishery has an important potential enforcement problem, indicated by fishermen's reports of illegal commercial fishing in the Goodnews River. Department personnel held several meetings in Goodnews Bay to discuss the fishing activities, and toward the end of the season, illegal fishing in the Goodnews River abated somewhat.

Subsistence Fishery:

Subsistence information from Goodnews Bay was very sparse for 1976. Subsistence catches from the subdistrict are always minimal.

Escapement:

Escapements of all species in the Goodnews River appeared adequate.

OUTLOOK FOR 1977

King Salmon

The majority of returning king salmon in 1977 will be five and six years of age. The Kogrukluk tower count during 1972 was slightly below average and no count was obtained in 1971 due to high and muddy river conditions. Commercial and subsistence catch data indicate at least average runs occurred during 1971 and 1972.

The Department has been examining the relationship of Japanese mothership catches in the Bering Sea to returns to western Alaska two years later (high seas harvests are composed of a majority of immature four year olds). The relatively large 1976 run to western Alaska, at least in Bristol Bay and in the Kuskokwim River, was correlated to a high CPUE (catch per unit of effort) on the high seas in 1974. The CPUE of the Japanese fleet in 1975 decreased substantially from that of 1974 which may indicate smaller runs to western Alaska this coming season.

Chum Salmon

Chum salmon will return as three, four, and five year old fish from 1972, 1973, and 1974 brood years. The majority of the run will be composed of four year olds which are the progeny of 1973 spawners. Little comparative escapement information is available, but Kogrukluk tower counts during 1973 and 1974 were below average. Commercial catch per unit effort was below average in 1973. It is known also that Yukon chum salmon escapements in 1973 were the smallest during the past five year period and so there is good reason to expect no more than an average return at best. There is certainly nothing to indicate a repeat of the large run experienced in 1976.

Coho Salmon

There is little information available to assess coho salmon abundance in 1977. The majority of cohos mature at four years of age with a few maturing

at five years. Due to a lack of funding, very few coho salmon escapement surveys can be made. Commercial catches made during the 1972 and 1973 brood years were above average, but catch per unit effort data were only average.

Pink Salmon

Pink salmon returns during all odd-years (1975, 1977, etc.) are normally small.

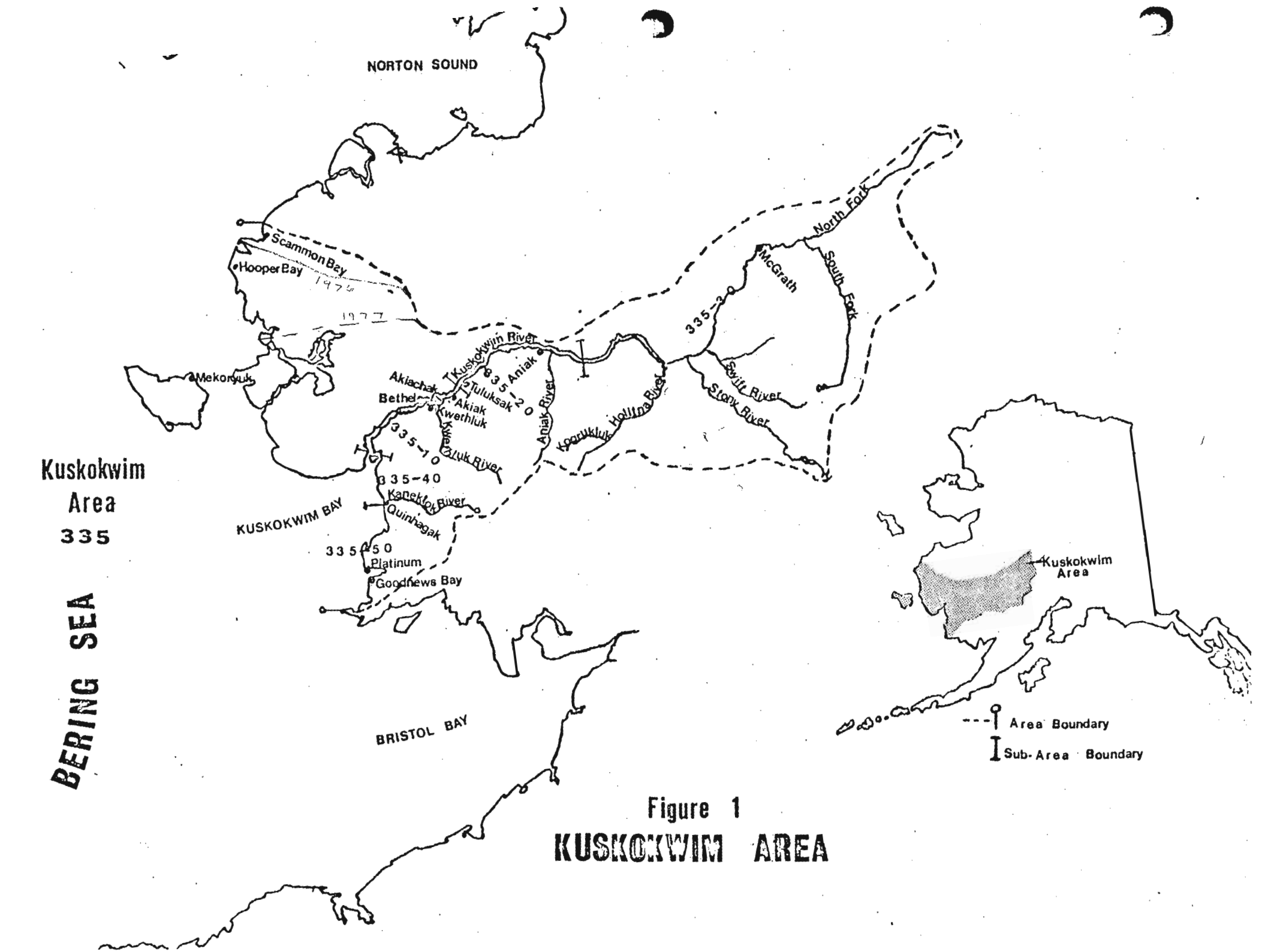


Figure 1

KUSKOKWIM AREA

Location	Mileages from Mouth	Mileages from Kwegooyuk 1/	Mileages from Bethel
Kuskokwim River			
Mouth	0	-30	-86
Eek Island 60°10' N. lat.	23	- 7	-63
Kwegooyuk 1/	30	0	-56
Tuntutuliak Village	43	13	-43
Kialik River Mouth	42	12	-44
Kialik Forks	58	28	-60
Fowler Island	55	25	-31
Johnson River	66	36	-20
Nunapitchuk	98	68	-52
Kasigluk	99	69	-53
Napakiak	72	42	-14
Oscarville	79	49	- 7
Napaskiak	79	49	- 7
Bethel	86	56	0
Kuskokwak River	102	72	16
Kwethluk	104	74	18
Akiachuk	112	82	26
Akiak	126	96	40
Mishevik Slough	131	101	45
Tuluksak	143	113	57
Lower Kalskag	189	159	103
Kalskag	192	162	106
Aniak	225	195	139
Chuathbaluk (Russian Mission)	236	206	150
Kolmakof River	249	219	163
Napaimiut	258	228	172
Oskawalik River	292	262	206
Crooked Creek	295	265	209
Georgetown	313	283	227
Red Devil	332	302	246
Sleetmute	339	309	253
Holitna River	341	311	255
Kasheglok	465	435	379
Kogrukluk River	467	437	381
Stony River Village	369	339	283
Stony River			
Lime Village			
Swift River	386	356	300
Devil's Elbow	407	377	321
Candle	491	461	405
McGrath	511	481	425
Big River	558	528	472
Medfra	582	552	496
Nicolai			
Telida			
Kuskokwim Bay			
Quinhagak	-19	-49	-105
Kagati Lake			
Goodnews Bay	-54	-84	-140
Platinum	-57	-87	-143
Goodnews Bay Village	-66	-96	-152
Chagvan Bay	-73	-103	-159

1/ Kwegooyuk is the location of Department's test fishing site.

Table 2. List of fishes found in the Kuskokwim area.

Species code	Genre species	Common name
601	Lampetra japonica	Arctic lamprey
570	Stenodus leucichthys	Shee
581	Coregonus nasus	Broad Whitefish
582	Coregonus pidschian	Humpback Whitefish
583	Coregonus sardinella	Least Cisco
	Coregonus laurettae	Bering Cisco
585	Prosopium cylindraceum	
	Prosopium coulteri	Pygmy Whitefish
610	Thymallus arcticus	Arctic Grayling
550	Salvelinus namaycush	Lake Trout
520	Salvelinus alpinus	Arctic Char
530	Salvelinus malma	Dolly Varden
541	Salmo gairdneri	Rainbow Trout
410	Oncorhynchus tshawytscha	King Salmon
420	Oncorhynchus nerka	Red Salmon
430	Oncorhynchus kisutch	Coho Salmon
440	Oncorhynchus gorbuscha	Pink Salmon
450	Oncorhynchus keta	Chum Salmon
513	Osmerus eperlanus	Boreal Smelt
514	Hypomesus olidus	Pond Smelt
560	Esox lucius	Pike
605	Dallia pectoralis	Blackfish
650	Hybopsis plumbea	Lake Chub
640	Catostomus catostomus	Longnose Sucker
670	Percopsis omiscomaycus	Trout-perch
590	Lota lota	Burbot, Lush
609	Pungitius pungitius	9-spine Stickleback
608	Gasterosteus aculeatus	3-spine Stickleback
161	Cottus aleuticus	Coastrange Sculpin
162	Cottus cognatus	Slimy Sculpin

ESTUARINE

113	Eleginus gracilis	Saffron Cod
166	Oligocottus maculosus	
121	Pleuronectes stellatus	Starry Flounder
122	Liopsetta glacialis	Arctic Flounder
230	Clupea pallasii	Pacific Herring

Table 3. Kuskokwim district emergency orders, 1976.

E.O.No.	Date	Action taken	Justification
1	17 June	Subdistrict 1 opened for commercial fishing.	Kings present in sufficient numbers.
2	20 June	Subdistrict 2 opened for commercial fishing,	Kings present in sufficient numbers.
3	20 June	Subdistricts 4 and 5 opened to commercial fishing.	Provide additional data regarding king salmon run, size and fishing effort.
4	22 June	Subdistrict 1 closed to commercial fishing.	Harvest goal attained.
5.	23 June	Subdistrict 2 closed to commercial fishing.	Quota attained.
6	23 June	Subsistence king salmon roe sales terminated in subdistrict 1.	Quota attained.
7	27 June	Subsistence king salmon roe sales terminated in subdistricts 2, 4 and 5.	Quota attained
8	27 June	Hooper Bay opened to subsistence salmon roe sales.	Based upon meeting between village and Dept. personnel.
9	27 June	Lower subdistrict 1 opened for commercial fishing.	Chums present in sufficient numbers.
10	4 July	Lower subdistrict 1 closed for July 5 commercial fishing period.	To prevent over harvest of a chum run segment.
11	10 July	Subsistence salmon roe sales terminated in subdistricts 1, 2 and 4.	Quotas attained.
12	12 July	Lower subdistrict 1 is closed to commercial salmon fishing.	Prevent over harvest of chums.
13	18 July	Subdistricts 4 and 5 opened to commercial fishing for three 12-hour periods per week.	Majority of king salmon run has passed through the fisheries; allo increased harvest of other species
14	31 July	Subdistrict 1 opened to 24-hr. commercial fishing period.	Provide additional data regarding coho salmon run size and fishing effort.
15	4 Aug.	Fishing periods changed to encompass daylight hours in subdistrict 4.	To aid fishermen safety.
16	6 Aug.	Lower subdistrict 1 opened to 48 hour commercial fishing periods.	To allow optimum coho salmon harvest.

Table 4. Kuskokwim district regulatory changes adopted by the Board of Fisheries, December 1976.

1. The northern boundary of the Kuskokwim district will be the Naskonat Peninsula instead of Cape Romanzof.

2. Regulation of weekly commercial fishing periods by emergency order from June 1 through June 25 in subdistrict 1. This is a change from the previous set fishing periods of Monday and Thursday.

3. Delay implementation of gillnet depth restrictions from January 1, 1977 to January 1, 1978. This was due to a lack of preparedness on the part of the fishermen.

4. Create a separate quota of 2000 coho salmon in subdistrict 2 rather than a combined 2000 chum, red, and coho salmon quota.

5. Require processors who buy roe to make a written report twice a week rather than once a week. This allows closer control of subsistence roe sales, allowing for closer control of roe quotas.

6. Confine subsistence salmon gear to gill nets, fishwheels, and beach seines; with the exception of legal spear fishing on the Holitna River. This eliminates the possibility of non-traditional gear being used for subsistence salmon fishing.

7. Close subsistence salmon fishing for 6 hours after the end of commercial salmon fishing period in subdistricts 1, 4 and 5. This allows for enforcement of the commercial salmon closure.

8. Close subsistence salmon fishing in the Kanektok and Goodnews Rivers during commercial salmon periods. This allows enforcement of commercial closure of rivers during commercial bay fishing periods.

9. Buoys for subsistence salmon gillnets shall be any color except red. This allows enforcement of closed waters section of commercial fishing regulations.

Table 5. Summary of special projects conducted in the Kuskokwim district, 1976.

1. Kuskokwim River Test Fishing.

   A. Location: Kwegooyuk on the east bank of the mouth of the Kuskokwim River located 56 river miles downstream from Bethel.
   b. Objectives: Determine run timing and relative abundance of kings, red and chum salmon.
   c. Results: A total of 1206 king, 451 red and 2101 chum salmon was taken in set gillnets fished from June 5 through July 15. The king salmon run was above average magnitude. The chum salmon run was also above average and peaked out about June 26.

2. Kogrukluk River Counting Tower.

   a. Location: About 3 miles on the Kogrukluk River, tributary to the Holitna River.
   b. Objectives: Determine daily and seasonal timing and magnitude of all species of salmon entering this stream. Conduct visual size of relative age of the king salmon escapement.
   c. Results: The estimated expanded count of salmon escapement from July 1 to July 31 was 3,261 kings, 4,433 reds, 2 pinks, and 9,170 chums. These counts were the highest for red and chum salmon since tower enumeration of escapement began in 1969. The king salmon count, while above the average of 2,780 is only 84 percent of the highest recorded.

3. Kwethluk-Kisaralik Investigations.

   a. Location: Kwethluk and Kisaralik River areas.
   b. Objectives: Obtain subsistence information for possible in season management purposes.
   c. Results: Daily subsistence information was obtained from the villages of Kwethluk, Akiachak and Akiak. Crew also provided needed public relations function.

4. Commercial Salmon Catch Sampling.

   a. Location: Bethel
   b. Objectives: Obtain age, sex and size information for commercially caught fish.
   c. Results: Samples of all species were sampled, analyzed and presented in separate reports.

Table 5. (continued)

5. Ignatti Weir

a. Location: Upper Holitna River, about 1.5 miles below the Kogrukluk River.
b. Objectives: Develop a portable weir and trap to enumerate salmon escapement by species and sex and to obtain salmon for sampling without causing harm to the fish.
c. Results: The weir was constructed in 48 man hours of labor after the materials were on site. Operation of the weir was from June 29 to July 31, with 5,507 king salmon, 2,202 red salmon, and 8,046 chum salmon passing through the trap. Sex ratios, male: female: were: king salmon 60:40; red salmon 86:14; and chum salmon 83:17. Ten percent of the king and red salmon and 10% or a maximum of 10 chum salmon per day were sampled for age-length-sex data.

Table 6. Kuskokwim District Processors and Associated Data, 1976.

Commercial Operator	Product	Subdistrict
Alaska Seafoods c/o Frenchie Walsh Camp Bethel, A~~Kaska~~, 99559	Fresh salmon King Red Chum Coho	1
Association of Kuskokwim Fishermen Box 247 Bethel, AK 99559	Fresh salmon King Chum Coho	1
James A. Charles Tuntutuliak,AK.	Frozen salmon King Chum Frozen whitefish	1
Clark Fishing Enterprises Box 517 Aniak, AK.	Fresh salmon King Salmon Roe	2
Commencement Bay Fisheries 1112 54th Ave. East Tacoma, Wa 98424	Frozen salmon King Red Chum Pink Coho Salmon Roe	1, 4
J. B. Crow Box 567 Bethel, AK. 99559	Fresh salmon King Red Chum Pink Coho Salmon Roe Frozen whitefish	1, 2, 4
Denton Sherry 17221 Palatine Ave. No. Seattle,WA 98131	Frozen salmon King Red Chum Pink Coho	5

Table 6. (continued)

Elm Corp. Box 352 Bethel, Ak. 99559	Fresh salmon King Chum Coho Salmon roe	1
Kachemak Seafood, Inc. Box 129 Togiak, Ak.	Fresh salmon King Red Chum Pink Coho	5
Kemp-Paulucci Seafoods, Inc. Box 252 Bethel, Ak. 99559	Frozen salmon King Red Chum Pink Coho Salmon roe	1, 2, 4
K & A Fisheries c/o Joe Parent Kalskag, Ak. 99607	Fresh salmon King	2
Patson Enterprises Box 445 Bethel, AK. 99559	Fresh salmon King Red Chum Coho Pink Salmon roe	1, 4
Pete Merry Guide Services 1206 Copper Fairbanks Ak. 99701	Fresh salmon King	1
Togiak Fisheries 2366 Eastlake Ave. East Suite 335 Seattle, WA. 98102	Fresh salmon King Red Chum Pink Coho	5

Table 7. Kuskokwim district licenses issued by village and subdistrict, 1976.

Stat. Area	Village	Commercial	Vessel	Drift	Set	Total
335-10	Kwigillingok	13	11	10	1	35
	Kipnuk	9	6	6	0	21
	Kongiganak	28	22	21	1	72
	Tuntutuliak	70	51	50	1	172
	Eek	46	35	35	0	116
	Kasigluk	59	39	39	0	137
	Nunapitchuk	60	45	41	0	146
	Atmauthluak	28	21	21	0	70
	Napakiak	56	44	42	3	142
	Oscarville	6	6	6	0	18
	Napaskiak	29	24	24	0	77
	Bethel	326	226	200	16	768
	Kwethluk	102	70	70	0	242
	Akiachak	73	52	46	2	173
	Akiak	44	28	27	0	99
	Tuluksak	22	20	20	0	62
	Mekoryuk	1	0	0	0	1
	Alakanuk	1	1	1	1	3
	Anchorage	2	0	1	0	3
	Out of State	12	3	0	0	15
335-20	Kalskag	12	8	8	1	29
	Aniak	9	5	4	1	19
	Chuathbaluk	1	1	1	0	3
335-40	Quinhagak	94	76	75	0	245
335-50	Goodnews Bay	40	31	29	0	100
	Platinum	2	1	1	0	4
SUBTOTALS	335-10	987	704	660	21	2,372
	335-20	22	14	13	2	51
	335-40	94	76	75	0	245
	335-50	42	32	30	0	104
TOTALS		1,145	826	778	23	2,772

Table 8. Commercial and subsistence salmon catches by species and statistical area, Kuskokwim district, 1976.

Subdistrict	King	Red	Coho	Pink	Chum[1/]	Total
335-10 Lower Kuskokwim						
Commercial	27,418	2,971	87,933	133	176,727	295,18
Subsistence [2/]	46,522	-	- 3/	-	140,258	186,78
Total	73,940	2,971	87,933	133	316,985	481,96
335-20 Middle Kuskokwim						
Commercial	3,317		568		1,137	5,02
Subsistence [2/]	9,507		- 3/		58,537	68,04
Total	12,824		568		59,674	73,06
335-30 Upper Kuskokwim						
Commercial	0		0		0	
Subsistence [2/]	1,888		- 3/		24,997	26,88
Total	1,888		0		24,997	26,88
Subtotal Kuskokwim River						
Commercial	30,735	2,971	88,501	133	177,864	300,20
Subsistence [2/]	57,917	-	- 3/	-	223,792	281,70
Total	88,652	2,971	88,501	133	401,656	581,91
335-40 Quinhagak						
Commercial	14,110	6,090	13,777	31,412	43,659	109,04
Subsistence [2/]	2,217	-	- 3/	-	5,930	8,14
Total	16,327	6,090	13,777	31,412	49,589	117,19
335-50 Goodnews Bay						
Commercial	4,417	5,575	9,852	8,453	10,354	38,65
Subsistence	201	-	- 3/	-	1,428	1,62
Total	4,618	5,575	9,852	8,453	11,782	40,28
Total Kuskokwim District						
Commercial	49,262	14,636	112,130	39,998	231,877	447,90
Subsistence [2/]	60,335	-	- 3/	-	231,150	291,48
Total	109,597	14,636	112,130	39,998	463,027	739,38

1/ Subsistence catches contain small numbers of red and pink salmon.

2/ Expanded data.

3/ Insufficient data for valid determination.

Table 9. Average weight of salmon taken in the Kuskokwim district commercial fishery, 1976. 1/

Subdist.	Statistical Area	Average Weights by Species 2/ King	Red	Coho	Pink	Chum
Kuskokwim River:	335-10 335-20	22.7(10.)	4/	7.1(3.2)	4/	6.9(3.0)
Quinhagak:	335-40	11.7(5.3)	6.2(2.8)	4/	3.2(1.5)	7.1(3.2)
Goodnews Bay:	335-50	16.5(7.5)	7.1(3.2)	8.5(3.9)	3.8(1.7)	7.0(3.2)

1/ Data obtained from processor weights, randomly sampled.

2/ Pounds (kilograms).

3/ Samples taken in 335-10 only.

4/ Data insufficient or unavailable.

Table 10 mercial salmon catch data, lower Kuskokwim Riv. Subdistrict 1, Stat. Area 335-10), all gear combined, 1976.

Period Code	Date of Landing	Hours Open to fishing	Fishermen	Fishermen Hours	Catch King	Red	Coho	Pink	Chum	Catch/Fishermen Hour King	Coho	Chum
	6/17	6										
1	Period	6	459	2,754	6,962	1			532	2.5		0.2
	6/21	6										
2	Period	6	495	2,970	13,048				2,543	4.4		0.9
	Subtotal 1/	12	561	5,724	20,010	1			3,075	3.5		0.5
	6/28	6										
3	Period	6	348	2,088	4,143	508			42,464	2.0		20.3
	7/1	6										
4	Period	6	415	2,490	1,550	338			44,024	0.6		17.7
	7/8	6										
5	Period	6	381	2,286	894	1,268		57	48,669	0.4		21.3
	7/12	6										
6	Period	6	377	2,262	344	701		16	21,153	0.2		9.4
	7/15	6										
7	Period	6	265	1,590	236	151	44	7	14,176	0.1	0.0	8.9
	Subtotal 2/	30	517	10,716	7,167	2,966	44	80	170,486	0.7	0.0	15.9
	8/2	18										
	8/3	6										
8	Period	24	286	6,864	83		10,534	7	2,067	0.0	1.5	0.3
	8/9	18										
	8/10	24										
	8/11	6										
9	Period	48	400	19,200	96	3	29,728	20	866	0.0	1.5	0.0
	8/16	18										
	8/17	24										
	8/18	6										
10	Period	48	387	18,576	50	1	28,664	17	154	0.0	1.5	0.0
	8/23	18										
	8/24	24										
	8/25	6										
11	Period	48	300	14,400	10		14,543	8	69	0.0	1.0	0.0
	8/30	18										
	8/31	24										
12	Period	42	174	7,308	2		4,420	1	10	0.0	0.6	0.0
12	Subtotal 3/	210	516	66,348	241	4	87,889	53	3,166	0.0	1.3	0.0
	Grandtotal	252	674	82,788	27,418	2,971	87,933	133	176,727			

1/ King Salmon Season 6/17-6/21

2/ Chum Salmon Season 6/28-7/15

3/ Coho Salmon Season 8/2-8/31

Table 11. Commercial salmon catch data, lower Kuskokwim River downstream of Napakiak (Subdistrict 1, 335-11), all gear combined, 1976.

Period Code	Date of Landing	Hours Open to fishing	Fishermen	Fishermen Hours	Catch					Catch/Fishermen Hour		
					King	Red	Coho	Pink	Chum	King	Coho	Chum
	6/17	6										
1	Period	6	215	1,290	3,210	1			191	2.5		0.2
	6/21	6										
2	Period	6	280	1,680	7,046				1,121	4.2		0.7
	Subtotal 1/	12	325	2,970	10,256	1			1,312	3.5		0.4
	6/28											
3	Period	6	348	2,088	4,143	508			42,464	2.0		20.3
	7/1	6										
4	Period	6	415	2,490	1,550	338			44,024	0.6		17.7
	7/8	6										
5	Period	6	381	2,286	894	1,268		57	48,669	0.4		21.3
	7/12	6										
6	Period	6	377	2,262	344	701		16	21,153	0.2		9.4
	7/15	6										
7	Period	6	265	1,590	236	151	44	7	14,176	0.1	0.0	8.9
	Subtotal 2/	30	517	10,716	7,167	2,966	44	80	170,486	0.7	0.0	15.9
	8/2	18										
	8/3	6										
8	Period	24	197	4,728	54		7,212	6	1,255	0.0	1.5	0.3
	8/9	18										
	8/10	24										
	8/11	6										
9	Period	48	228	10,944	40	1	17,228	13	318	0.0	1.6	0.0
	8/16	18										
	8/17	24										
	8/18	6										
10	Period	48	216	10,368	17		12,480	1	33	0.0	1.2	0.0
	8/23	18										
	8/24	24										
	8/25	6										
11	Period	48	126	6,048	7		6,173	3	16	0.0	1.0	0.0
	8/30	18										
	8/31	24										
12	Period	42	72	3,024			1,657	1	6		0.5	0.0
	Subtotal 3/	210	351	35,112	118	1	44,750	24	1,628	0.0	1.3	0.0
	Grandtotal	252	598	48,798	17,541	2,968	44,794	104	173,426			

/ King salmon season 6/17-6/21

/ Chum salmon season 6/28-7/15

Table 12. Commercial salmon catches, lower Kuskokwim River upstream of Napakiak (subdistrict 1, Stat. area 335-12), all gear combined, 1976.

Period Code	Date of Landing	Hours Open to fishing	Fishermen	Fishermen Hours	Catch					Catch/Fishermen Hour		
					King	Red	Coho	Pink	Chum	King	Coho	Chum
	6/17	6										
1	Period	6	272	1,632	3,752				341	2.3		0.2
	6/21	6										
2	Period	6	251	1,506	6,002				1,422	4.0		0.9
	Subtotal 1/	12	352	3,138	9,754				1,763	3.1		0.6
	8/2	18										
	8/3	6										
8	Period	24	103	2,472	29		3,322	1	812	0.0	1.3	0.3
	8/9	18										
	8/10	24										
	8/11	6										
9	Period	48	256	12,288	56	2	12,500	7	548	0.0	1.0	0.0
	8/16	18										
	8/17	24										
	8/18	6										
10	Period	48	218	10,464	33	1	16,184	16	121	0.0	1.5	0.0
	8/23	18										
	8/24	24										
	8/25	6										
11	Period	48	215	10,320	3		8,370	5	53	0.0	0.8	0.0
	8/30	18										
	8/31	24										
12	Period	42	122	5,124	2		2,763		4	0.0	0.5	0.0
	Subtotal 2/	210	362	40,668	123	3	43,139	29	1,538	0.0	1.1	0.0
	Grand Total	222	500	43,806	9,877	3	43,139	29	3,301			

1/ King salmon season 6/17-6/21

2/ Coho salmon season 8/2-8/31

Table 14. Age and sex composition of Kuskokwim district King Salmon sampled at various locations, 1976

Area (gear)	Combined Age Classes			Age 4_2		Age 5_2		Age 6_2		Age 7_2	
	Sex	No.	%	No.	%	No.	%	No.	%	No.	%
Kwegooyuk (8-1/2" mesh set gillnet)	Male	359	44.4	15	1.9	168	20.8	176	21.7	0	0.0
	Female	450	56.6	0	0.0	98	12.1	351	43.4	1	0.1
	Total	809	100.0	15	1.9	266	32.9	527	65.1	1	0.1
Kwegooyuk (5-1/2" mesh set gillnet)	Male	125	90.6	84	60.9	26	18.8	15	10.9	0	0.0
	Female	13	9.4	0	0.0	5	3.6	7	5.1	1	0.7
	Total	138	100.0	84	60.9	31	22.4	22	16.0	1	0.7
Bethel (8-1/2" mesh gillnet)	Male	115	51.6	0	0.0	75	33.7	39	17.5	1	0.4
	Female	108	48.4	0	0.0	17	7.6	86	38.5	5	2.3
	Total	223	100.0	0	0.0	92	41.3	125	56.0	6	2.7
Quinhagak (5-1/2" mesh gillnet)	Male	274	78.5	177	50.7	81	23.2	16	~~46.0~~ 4.6	0	0.0
	Female	75	21.5	8	2.3	25	7.1	40	11.5	2	0.6
	Total	349	100.0	185	53.0	106	30.3	56	~~57.5~~ 16.1	2	0.6
Ignatti Weir	Male	206	54.8	27	7.2	137	36.4	42	11.2	0	0.0
	Female	171	45.3	0	0.0	12	3.2	158	41.8	1	0.3
	Total	377	100.1	27	7.2	149	39.6	200	53.0	1	0.3

1) Commercial catch sample

2) Test fish samples

3) Weir sample

Table 15. Kuskokwim River subsistence fishery data, 1976.

Village	Fishing Family Data: Families	People	Dogs	Snow-Machines	Estimated Salmon catch 1/: King	Other 2/ Salmon	Coho 3/	Units of Gear: 8-1/2" Nets	5-1/2" Nets	Fish Wheels
Kipnuk					75	463				
Kwigillingok					122	439				
Kongigonak										
Eek	24	134	75	28	3232	3637	788	19	15	
Tuntutuliak	29	183	112	36	4807	8390	50	27	25	
Kasigluk	29	240	81	37	1613	4044	6	19	19	
Nunapitchuk	33	223	134	54	2578	6466	85	23	23	
Atmauthluak	13	82	33	15	1159	3361	85	12	10	
Napakiak	34	204	83	42	3330	9265	212	32	31	
Oscarville	7	45	31	7	623	2376	40	7	3	
Napaskiak	18	121	63	22	3566	21380	138	18	19	
Bethel	97	720	258	105	13215	26533	437	83	78	
Kwethluk	43	245	203	58	4193	26443	677	41	40	
Akiachak	29	209	91	43	4915	15298	752	26	25	
Akiak	22	135	207	28	3076	12163	174	23	25	
Tuluksak	22	169	98	30	1411	11673	160	19	23	
Lower Kalskag	23	139	105	26	4536	17158	11	18	20	
Upper Kalskag	15	83	73	15	1413	8527	167	11	13	
Aniak	14	73	47	13	1490	13355	152	10	7	2
Chuathbaluk	9	58	26	26	657	7824	143	8	8	
Napaimute	2	7	8	2	420	1636	17		2	1
Georgetown										
Crooked Creek	5	35	20	3	264	3236		2	4	1
Red Devil	3	15	13	3	195	4231		1	3	1
Sleetmute	13	57	50	5	356	7571	57	3	13	
Stony River	6	30	36	9	620	5523		2	7	3
Lime Village	4	18	33		33	2800	161		6	
Totals	494	3225	1880	607	57917	223792	4312	404	419	8

1/ Expanded data.

2/ Mostly chum with lesser number of reds, pinks, and a few small kings.

3/ Data is very fragmented and minimal.

Table 16. Commercial salmon catch data, Quinhagak (subdistrict 4, statistical area 335-40) all gear combined, 1976

Period Code	Date of Landing	Hours Open to Fishing	Fishermen	Fishermen Hours	Catch King	Catch Red	Catch Coho	Catch Pink	Catch Chum	Catch/Fishermen hour King	Catch/Fishermen hour Red	Catch/Fishermen hour Coho	Catch/Fishermen hour Chum
	6/21	6											
	6/22	6											
1	Period	12	60	720	2577	177		89	2668	3.6	0.2		3.7
	6/24	6											
	6/25	6											
2	Period	12	90	1080	4672	347		132	3057	4.3	0.3		2.8
	6/28	6											
	6/29	6				33							
3	Period	12	99	1188	2667	1324		1583	5643	2.2	1.0		4.8
	7/1	6											
	7/2	6											
4	Period	12	76	912	908	903		412	3891	1.0	1.0		4.3
	7/5	6											
	7/6	6											
5	Period	12	65	780	465	1325		2405	4084	0.6	1.7		5.2
	7/8	6											
	7/9	6											
6	Period	12	56	672	689	842		593	2623	1.0	1.3		3.9
	7/12	6											
	7/13	6											
7	Period	12	17	204	241	105		294	2849	1.2	0.5		14.0
	7/15	6											
	7/16	6											
8	Period 1/	12	80	960	937	193		12266	8377	1.0	0.2		8.7
	7/19	6											
	7/20	6											
9	Period	12	20	240	117	180		1107	1236	0.5	0.8		5.2
	7/21	6											
	7/22	6											
10	Period	12	70	840	441	185		4336	3566	0.5	0.2		4.2
	7/23	6											
	7/24	6											
11	Period	12	82	984	231	339	51	6576	3799	0.2	0.3	0.1	3.9
	7/26	6											
	7/27	6											
12	Period	12	61	732	64	166	88	926	770	0.1	0.2	0.1	1.1
	7/28	6											
	7/29	6											
13	Period	12	5	60	1	5	10	153	72	0.0	0.1	0.2	1.2
	7/30	6											
	7/31	6											
14	Period	12	26	312	23	39	165	289	453	0.1	0.1	0.5	1.5
	8/2	6											
	8/3	6											
15	Period 2/	12	25	300	14	17	389	106	213	0.0	0.1	1.3	0.7
	8/4	6											
	8/5	6											
16	Period	12	29	348	12	14	447	83	135	0.0	0.0	1.3	0.4
	8/6	6											
	8/7	6											
17	Period	12	36	432	13		582	8	36	0.0		1.3	0.1
	8/9	12											
18	Period	12	35	420	16	12	729	29	55	0.0	0.0	1.7	0.1
	8/11	12											
19	Period	12	31	372	8	5	613	8	32	0.0	0.0	1.6	0.1
	8/13	12											
20	Period	12	31	372	8	1	1339	8	27	0.0	0.0	3.6	0.1
	8/16	12											
21	Period	12	42	504	13	1	1850	9	41	0.0	0.0	3.7	0.1
	8/18	12											
22	Period	12	31	372	7		1743		2	0.0		4.7	0.0
	8/20	12											
23	Period	12	30	360	2		1680		11	0.0		4.7	0.0
	8/23	12											
24	Period	12	23	276	3		1297		8	0.0		4.7	0.0
	8/25	12											
25	Period	12	28	336			1303		10			3.9	0.0
	8/27	12											
26	Period	12	33	396	1		1015		1	0.0		2.6	0.0
	8/30	12											
27	Period	12	20	240			474					2.0	
	Grand Total	324	181	14784	14110	6090	13777	31412	43659				

1/ King salmon season considered ended when catches show definite decrease.
2/ Coho salmon season 8/2 - 8/30

Table 17. Aerial salmon escapement survey in the Kuskokwim district, 1976.

	Survey Conditions	Date	Kings	Reds	Cohos	Pinks	Chums
Kuskokwim Bay							
Goodnews River System							
Main river; mouth to lake	good	7/31	1150	2200		4720	16900
Awayak Creek: mouth to headwater lake	good	8/5		no fish seen			
North Lake	good	8/5		260			
South Lake	good	8/5		no fish seen			
Goodnews Lake							
main lake	good	7/31		1170			
Inlet Creek	good	7/31		2570			
Middle-fork, Goodnews River							
mouth to Kukaktlin Cr.	good	8/5	580	1390		12905	4860
Kukaktlim Creek to lakes	good	8/5	192	1471			210
lake:north fork	Good	8/5		640			
lake: south fork	good	8/5		1090			
Kukaktlim Lake							
main lake	fair	8/5		1360			
lakes	fair	8/5		650			
South Fork							
mouth to Tivyagaka creek	good	8/5	5	80		315	1010
Kanektok River System							
Main river: mouth to top fish camp	fair/good	7/31	thousands of fish - no count				
Main river: bluff to top fish camp	fair/good	7/31	400	800		7600	6650+
Main river:last mountain to bluff	fair	7/31	564	409		1300	1240+
Main river:Klak Creek to last mountain	fair	7/31	1853	1481			805+
Main river:Paiyun Creek mouth to Klak Creek	fair	7/31	138	135			2
Main River:lake outlet to mouth Paiyun Creek	fair	7/31	124	111			

Table 17. (continued)

	Survey Conditions	Date	Kings	Reds	Cohos	Pinks	Chums
Kagati Lake							
main lake	fair	7/31		20000+			
three unnamed lakes		7/31		354			
Kanuktik Creek							
mouth to forks	fair	8/5	97	2			
Kuskokwim River							
Aniak River System							
main river: at Aniak	poor	7/14					5000
main river: mouth to Buckstock R.	poor	7/14					8265
main river: Kipchuk R. to Gemuk Mt.	fair	7/14	281				120
main river: Lake to Kipchuk R.	fair	10/1			36		
Buckstock River: entire	poor	7/25	210				1250
Kipchuk River, mouth to big bend	fair	7/14	177				1425
Salmon River							
lower 1 mile	poor	7/14	13				300
mouth to Marvel cr.	poor	7/16	86	25			380
Crooked Creek							
main river:mouth to Donlin Cr.	fair	7/18					20
Eek River 1/							
main river:mouth to 139 km.	poor	8/10	32		5	281	441
main river:130 km. to south fork	good	8/9	410	2		4	594
main river:south fork to Eek Lake Creek	good	8/9	86				15
main river:Eek Lake Cr. to Kapon Cr.		8/8	22	287			32
main river:Kapon Cr. to Rainy Strip		8/6-8	68	3			2
George River							
main river:mouth to 10 mi. above confluence with north fork.	fair	7/18	191				1298
north fork		7/18	50				2200

1/ Boat Survey

Table 17. (continued)

	Survey Conditions	Date	Kings	Reds	Cohos	Pinks	Chums
Holitna River System							
main river: weir to Mellick's cabin	poor	7/26	1168	404			23390
main river: Nogamute to 5 mi. below Taylor Cr.	poor	8/2	2019	300			118980
main river:Kashegelok to Nogamute	fair	8/2	2235	2027			34840
main river:weir to Kashegelok	fair	8/2	336	220			100
main river: Shotgun Cr. to weir	good	8/2	277	85			342
Chukowan River entire	fair	7/16	727	76			696
Krogukluk River tower to Maka Creek	fair	7/16	518	1231			2444
Shotgun Creek,entire	fair	8/2	702	97			378
Hoholitna River							
south fork	poor	7/26	180				793
whitefish lake	poor	7/26	No fish seen/heavy turbulence				
Hohokuk River							
lower 7 miles	fair	7/17	5				
mouth to forks	fair	7/17	97				2220
right fork	fair	7/17	no fish seen				
left fork	fair	7/17	6				
middle fork	fair	7/17	23				56
Kisaralik River System							
main river: 10 mi below foothills to lake	fair	8/3	873				10921
Kisaralik Lake		8/3	No salmon seen				
Kasigluk River: above Kisaralik cutoff	fair	7/18					5860
Kwethluk River							
main river: Canyon Cr. to 40 mi. d.s.	fair	7/16	425				7576
	fair	8/3	997				2736
Canyon Creek - Crooked Cr. to mouth	fair	8/3	198				167
Middle Fork Kuskokwim River System							
Big River							
Blackwater Creek: entire	poor	7/25	34				
Unnamed Creek:lower 2 mi.		7/25	2				

Table 17. (continued)

	Survey Conditions	Date	Kings	Reds	Cohos	Pinks	Chums
Pitka Fork							
headwaters to Salmon R.	Poor	7/23	84				50
Bear Creek:entire	good	7/25	182				
Sullivan Creek:entire	good	7/23	13				
Salmon River							
main river:left fork	fair	7/23	104				
main river:middle fork	fair	7/23	995				45
	fair	7/25	1149				20
North Fork Kuskokwim River							
Soda Creek: entire	fair	7/23	34				
Oskawalik River							
main river: entire	fair	7/17	204				1605
Selatna River							
main river: mouth forks 10 mi. u/s	poor	7/25	50				200
Stony River							
Can Creek: entire	fair	7/25	10				1369
Swift River							
Cheeneetnuk River:entire	fair	7/25	1203				516
Gagaryah River:mouth to foothills	good	7/25	663				
Unnamed creek:mouth to 5 mi. u/s	good	7/25	8				
Takotna River							
Nixon Fork: Hosmer Cr. to Washington Cr.	fair	7/24	188				280
Tatliwiksuk River							
main river: mouth to Pete Shepherd's cabin	fair	7/24	212				5600
Tonzona River							
Dennis Creek: mouth to lake	poor	7/23	2				
Little Tonzona River							
Unnamed Creek:entire		7/27	46				120
Tuluksak River							
main river: entire	fair	7/17	139				5463

Table 18. Commercial salmon catch data, Goodnews Bay (subdistrict 5, statistical area 335-50), all gear combined, 1976

Period Code	Date of Landing	Hours Open to Fishing	Fishermen	Fishermen Hours	Catch					Catch/Fishermen Hour			
					King	Red	Coho	Pink	Chum	King	Red	Coho	Chum
	6/21	6											
	6/22	6											
	Period	12	19	228	287	228		2	139	1.2	1.0		0.6
	6/24	6											
	6/25	6											
2	Period	12	18	216	341	192		8	115	1.6	0.9		0.5
	6/28	6											
	6/29	6											
3	Period	12	17	204	644	566		63	509	3.2	2.8		2.5
	7/1	6											
	7/2	6											
4	Period	12	19	228	848	716		340	1920	3.7	3.1		8.4
	7/5	6											
	7/6	6											
5	Period	12	25	300	1110	2196		1148	2623	3.7	7.3		8.7
	7/8	6											
	7/9	6											
6	Period	12	No fishing due to storm										
	7/12	6											
	7/13	6											
7	Period	12 1/	35	420	985	968		2573	2653	2.3	2.3		6.3
	7/15	6											
	7/16	6											
8	Period	12	19	228	58	155		359	366	0.3	0.7		1.6
	7/19	6											
	7/20	6											
9	Period	12	No fishing due to storm										
	7/21	6											
	7/22	6											
10	Period	12	26	312	46	199		785	568	0.1	0.6		1.8
	7/23	6											
	7/24	6											
11	Period	12	22	264	33	198	5	1178	637	0.1	0.8	0.0	2.4
	7/26	6											
	7/27	6											
12	Period	12	19	228	20	53	1	250	112	0.1	0.2	0.0	0.5
	7/28	6											
	7/29	6											
13	Period	12	8	96	8	18	1	97	21	0.1	0.2	0.0	0.2
	7/30	6											
	7/31	6											
14	Period	12	14	168	10	37	20	499	243	0.1	0.2	0.1	1.4
	8/2	6											
	8/3	6											
	Period	12	9	108	7	3	51	401	162	0.1	0.0	0.5	0.5
	8/5	6											
	Period	12	8	96		15	104	311	148		0.2	1.1	1.5
	8/6	6											
	8/7	6											
17	Period	12	8	96	2	10	31	55	19	0.0	0.1	0.3	0.2
	8/9	6											
	8/10	6											
18	Period	12	7	84	1	8	228	161	32	0.0	0.1	2.7	0.4
	8/11	6											
	8/12	6											
19	Period	12	6	72	3	2	438	57	31	0.0	0.0	6.1	0.4
	8/13	6											
	8/14	6											
20	Period	12	6	72	1	2	553	22	14	0.0	0.0	7.7	0.2
	8/16	6											
	8/17	6											
21	Period	12	11	132	4	2	1184	33	17	0.0	0.0	9.0	0.1
	8/18	6											
	8/19	6											
22	Period	12	15	180	2	5	1526	40	12	0.0	0.0	8.5	0.1
	8/20	6											
	8/21	6											
23	Period	12	16	192	4		1192	36	9	0.0		6.2	0.0
	8/23	6											
	8/24	6											
24	Period	12	8	96	1		354	8	2	0.0		3.7	0.0
	8/25	6											
	8/26	6											
25	Period	12	13	156		2	624	7	1		0.0	4.0	0.0
	8/27	6											
	8/28	6											
26	Period	12	11	132	1		373	2	1	0.0		2.8	0.0
	8/30	6											
	8/31	6											
27	Period	12	6	72			380	4				5.3	
	9/1	6											
	9/2	6											
28	Period	12	11	132			541	4				4.1	
	9/3	6											
	9/4	6											
29	Period	12	11	132			1370	1				10.4	
	9/6	6											
	9/7	6											
	Period	12	5	60			297					5.0	
	9/8	6											
	9/9	6											
31	Period	12	8	96	1		405			0.0		4.2	
	9/10	6											
	9/11	6											
32	Period 2/	12	4	48			174					3.6	
Grand Total		384	40	4848	4417	5575	9852	8453	10354				

1/ King salmon season considered ended when catches show definite decrease

2/ Coho salmon season 8/2 - 9/11

Appendix Table 1. Kuskokwim district commercial and subsistence salmon catches, 1913-1976.

	Commercial Catch						Subsistence Catch[1]		
Year	King	Red	Coho	Pink	Chum	Total	King	Other Salmon[2]	Total
1913	7,800					7,800			
1914		2,667				2,667			
1915									
1916	949					949			
1917	7,878					7,878			
1918	3,055					3,055			
1919	4,836					4,836			
1920	34,853					34,853			
1921	9,854					9,854			
1922	8,944	6,120				15,064			180,000
1923	7,254					7,254			
1924	19.253	900	7,167		7,167	34,487	14,700	203,148	217,848
1925	1,664	5,800				7,514	10,800	230,850	241,650
1926								738,576	738,576
1927								286,254	286,254
1928								481,090	481,090
1929								560,196	560,196
1930	7,515	2,448				9,963		538,650	538,650
1931	8,541					8,541		389,367	389,367
1932	9,339					9,339		746,415	746,415
1933							6,290	433,998	440,288
1934							20,800	597,132	617,932
1935	6,448		8,296			14,744	22,930	554,040	576,970
1936	624					624	33,500	549,423	582,923
1937	480					480		537,111	537,111
1938	624		828			1,452	10,153	400,242	410,395
1939	134					134	14,000	125,425	139,425
1940	247		500			747	8,000	415,523	423,523
1941	187		674			861	8,000	415,523	423,523
1942							6,400	325,339	331,739
1943							6,400	325,800	332,200

1946	2,288		674			2,962			
1947	5,356					5,356			

1951	4,210					4,210			
1954	57					57			
1959	3,760					3,760			
1960	5,969	5,649	5,498		3	17,119	20,361	327,297	347,658
1961	23,246	2,308	5,090	91	18,864	49,599	30,910	185,447	216,357
1962	20,867	10,313	12,598	4,340	45,707	93,831	14,642	165,626	180,268
1963	18,571		15,660			34,231	37,246	141,550	178,796
1964	21,230	13,422	28,992	939	707	65,290	30,853	214,942	245,795
1965	24,965	1,886	12,191		4,242	43,284	31,143	323,002	354,145
1966	25,823	1,030	22,985	268	2,610	52,716	53,606	201,002	254,608
1967	29,986	652	58,239		8,235	97,112	61,224	252,447	313,671
1968	43,157	5,884	154,302	75,818	19,694	298,845	34,986	301,531	336,517
1969	64,777	10,362	110,473	1,251	50,377	237,240	43,732	245,299	289,031
1970	65,082	12,654	62,245	27,422	60,566	227,979	71,376	263,746	335,122
1971	44,936	6,054	10,006	13	99,423	160,432	45,465	130,329	175,794
1972	55,482	4,312	23,880	1,952	97,197	182,823	43,335	131,514	174,849
1973	51,374	5,224	152,408	634	184,207	393,847	41,697	211,468	253,165
1974[3]	30,670	29,003	179,579	60,052	196,127	495,431	29,590	321 358	350,848
1975[3]	27,799	17,535	109,814	899	223,532	379,579	51,045	180,429	231,474
1976	49,262	14,636	112,130	39,998	231,877	447,903	60,335	235,488	295,823
1977	58 250	18 621	263 723	434	298 959	639 998			
5 year ave.	~~42,852~~	12,426	95,137	12,710	160,097		42,183	195,000	57,852

1/ Subsistence catches for 1960-1976 have been revised and corrected.
2/ Primarily chum salmon.
3/ Final catch data used.

Appendix Table 2. Kuskokwim district commercial, vessel, and gear licenses issued by subdistrict, 1970-1976

Commercial Year	335-10	335-20	335-40	335-50	Other	Total
1970	488	6	60	46		600
1971	551	24	51	28		654
1972	512	14	66	21		613
1973	646	15	61	24		746
1974	965	26	98	49		1,138
1975	940	11	90	58		1,099
1976	987	22	94	42		1,145
1977	1064	29	111	54		1,258
previous 5 yr. average	~~782~~	~~18~~	~~79~~	~~36~~		~~880~~ 948

Vessel Year	335-10	335-20	335-40	335-50	Tender	Other	Total
1970	373	5	53	37	11		479
1971	440	19	46	27	16		548
1972	428	13	53	18	8		520
1973	474	14	52	18	16		558
1974	738	17	89	39	22		995
1975	642	9	79	44	30		804
1976	704	14	76	32			826
1977 5 yr. average	544	14	64	29	18		~~669~~ 741 741

Set Net Year	335-10	335-20	335-40	335-50	Other	Total
1970	38	3		35		76
1971	49	4		18		71
1972	38	4		1		43
1973	18	6		1		25
1974	54	9		7		70
1975	38	1		9		48
1976	21	2				23
previous 5 yr. average	39	5		7		51

Drift Net Year	335-10	335-20	335-40	335-50	Other	Total
1970	355	2	53	36	1 1/	447
1971	412	16	46	27		501
1972	416	11	53	18		498
1973	471	13	52	18		554
1974	712	15	87	39		853
1975	655	8	79	42		784
1976	660	13	75	30		778
1977 5 yr. average	533	13	63	29		737 638

1/ One herring seine.

Appendix Table 3. Kuskokwim district commercial catches by drainage, 1960-1976.

Kuskokwim River[1]	King	Red	Coho	Pink	Chum	Total
1960	5,969	0	2,498	0		8,467
1961	18,918	0	5,044	0		23,962
1962	15,341	0	12,432	0		27,773
1963	12,016	0	15,660	0		27,676
1964	17,149	0	28,613	0		45,762
1965	21,989	0	12,191	0		34,180
1966	25,545	0	22,985	0		48,530
1967	29,986	0	56,313	0	148	86,447
1968	34,278	0	127,306	0	187	161,771
1969	43,997	322	83,765	0	7,165	135,249
1970	39,290	117	38,601	44	1,664	79,716
1971	40,274	2,606	5,253	0	68,914	117,047
1972	39,454	102	22,579	8	78,619	140,762
1973	32,838	369	130,876	33	148,746	312,862
1974[4]	18,664	136	147,260	37	171,887	337,984
1975[4]	21,720	23	81,945	10	181,840	285,538
1976	30,735	2,971	88,501	133	177,864	300,204
5 year average	30,950	647	77,583	18	130,001	238,839

Quinhagak (Kanektok R.)[2]	King	Red	Coho	Pink	Chum	Total
1960	0	5,649	3,000	0	0	8,649
1961	4,328	2,308	46	90	18,864	25,636
1962	5,526	10,313	0	4,340	45,707	65,886
1963	6,555	0	0	0	0	6,555
1964	4,081	13,422	379	939	707	19,528
1965	2,976	1,886	0	0	4,242	9,104
1966	278	1,030	0	268	2,610	4,186
1967	0	652	1,926	0	8,087	10,665
1968	8,879	5,884	21,511	75,818	19,497	131,589
1969	16,802	3,784	15,077	953	38,206	74,822
1970	18,629	5,393	16,850	15,195	46,556	102,623
1971	4,185	3,118	2,982	13	30,208	40,506
1972	15,880	3,286	376	1,878	17,247	38,667
1973	14,993	2,783	16,515	277	19,680	54,248
1974[4]	8,704	19,510	10,979	43,642	15,298	98,133
1975[4]	3,928	8,584	10,742	486	35,233	58,973
1976	14,110	6,090	13,777	31,412	43,659	109,048
5 year average	9,538	7,456	8,319	9,259	23,533	71,814

Goodnews Bay (Goodnews River)[3]	King	Red	Coho	Pink	Chum	Total
1968			5,485			5,485
1969	3,978	6,256	11,631	298	5,006	27,169
1970	7,163	7,144	6,974	12,183	12,346	45,630
1971	477	330	1,771	0	301	2,879
1972	264	924	925	66	1,331	3,510
1973	3,543	2,072	5,017	324	15,781	26,737
1974[4]	3,302	9,357	21,340	16,373	8,942	59,314
1975[4]	2,151	8,928	17,127	403	6,459	35,068
1976	4,417	5,575	9,852	8,453	10,354	38,651
5 year average	1,947	4,322	9,236	3,433	6,563	32,656

1/ Includes subdistricts 335-10, 335-20 and 335-30. Commercial fishing in 335-30 has been prohibited since 1966.
2/ Subdistrict 335-40
3/ Subdistrict 335-50 and includes Chagvan Bay
4/ Final catch data used.

Appendix Table 4. Comparable commercial king salmon catch data, Kuskokwim district, 1960--1976.

Total catch (king salmon season only) Really?

Year	335-10	335-20	335-30	335-40	335-50	335-60	Total
1960	2,927	1,231	1,811		0	0	5,969
1961	15,820	1,551	1,547	4,328	0	0	23,246
1962	13,306	2,035	0	5,526	0	0	20,867
1963	9,095	2,921	0	6,555	0	0	18,571
1964	15,754	1,395	0	4,081	0	0	21,230
1965	21,452	537	0	2,976	0	0	24,965
1966	25,212	333	0	278	0	0	25,823
1967	29,371	615	0	0	0	0	29,986
1968	33,452	826	0	8,879	0	0	43,157
1969	43,144	853	0	16,802	3,971	7	64,777
1970	37,827	1,463	0	18,629	7,163	0	65,082
1971	37,835	2,439	0	4,185	477	0	44,936
1972	37,699	1,755	0	15,880	148	0	55,482
1973	30,594	2,244	0	14,993	3,543	0	51,374
1974	17,611	953	0	8,704	3,302	0	30,670
1975[1/]	20,457	1,263	0	3,928	2,151	0	27,799
1976	27,418	3,317	0	14,110	4,417	0	49,262
5 year average	28,859	1,731		9,538	1,924		

1/ Final catch data

Appendix Table 5. Commercial salmon pack by species in round weight (lbs.), Kuskokwim district, 1968, 1976.[1/]

	1968	1969	1970	1971	1972	1973	1974	1975	1976
Fresh or frozen									
king	794,682	1,032,863	1,113,890	801,628	1,400,243	1,371,685	566,941	159,845	935,652
red	36,480	25,351	68,116	30,635	4,319	37,816	179,768	108,216	95,761
coho	1,090,690	322,254	453,125	64,457	152,832	883,966	1,245,132	670,598	809,916
pink	303,270	3,413	90,703		6,442	2,092	246,134	2,809	133,911
chum	146,230	249,007	367,715	678,173	631,781	1,252,607	1,220,496	1,350,936	1,609,718
Salmon roe, (lbs. of finished product.)	2/	56,926	42,958	64,136	62,963	165,574	2/	43,113	120,405[3/]
Subsistence roe (lbs of raw product).									157,151

1/ Pack represents type of processing when fish were shipped out of district
2/ Information not available
3/ Raw Product

Appendix Table 6. Mean salmon weights and prices paid to fishermen, Kuskokwim district, 1964-1976.

Year	Mean weights-lbs.(kgs) King	Coho	Red	Pink	Chum
1964	23.2 (10.5)	6.5 (3.0)	5.8 (2.6)		6.1 (2.8)
1965	21.7 (9.9)	6.5 (3.0)	6.6 (3.0)		
1966	23.2 (10.5)	6.7 (3.0)			
1967	27.8 (12.6)	5.9 (2.7)	7.4 (3.4)		7.0 (3.2)
1968	23.8 (10.8)	7.2 (3.3)	6.2 (2.8)	4.0 (1.8)	7.9 (3.6)
1969	19.6 (8.9)	7.3 (3.3)	6.2 (2.8)	3.6 (1.6)	5.8 (2.6)
1970	18.9 (8.6)	7.3 (3.3)	5.4 (2.5)	3.3 (1.5)	6.1 (2.8)
1971	26.2 (11.9)	6.1 (2.8)	6.9 (3.1)	2/	6.4 (2.9)
1972	24.7 (11.2)	6.4 (2.9)	2/	2/	6.5 (3.0)
1973	26.7 (12.1)	5.8 (2.6)	2/	2/	6.8 (3.1)
1974	17.1 (7.7)	7.5 (3.4)	6.3 (2A)	4.1 (1.9)	6.8 (3.1)
1975	14.9 (6.8)	8.2 (3.7)	2/	2/	6.4 (2.9)
1976	17.0 (7.7)	7.8 (3.5)	6.7 (3.0)	3.5 (1.6)	7.0 (3.2)

Year	Mean prices (per fish) King	Coho	Red	Pink	Chum
1964	$ 3.25	$ .35	$ .50	$	$
1965 1/					
1966	3.00	.40	.50	.10	.10
1967	3.55	.52	.40		.25
1968	3.74	.67	.60	.20	.35
1969	3.80	.76	.91	.22	.43
1970 3/	3.78	1.03	1.15	.26	.51
1971	4.53	.82	.71	2/	.50
1972	4.92	1.00	.88	.25	.54
1973	6.83	1.50	2.32	.53	1.28
1974	7.96	2.00	2.15	.93	1.71
1975	8.05	2.54 4/	2/	2/	1.67
1976	10.82	3.12	2.85	.88	1.89

1/ Samples available only for two periods - 7/1-2 - 7/5-6.
2/ Information unavailable
3/ Information not available for 335-50 (Goodnews) only fished one day.
4/ Information not available for 335-40 (quinhagak).

Appendix Table 7. Dollar value estimates of Kuskokwim district commercial fishery, 1964-1976 1/

Year	Gross Value of catch to fishermen	Wages earned 2/	Total income to district	Wholesale value of pack 3/	Tax revenues to state
1964	$ 83,030.00	$	$	$ 409,700.00	$ 6,100.00
1965	90,950.00			370,000.00	8,200.00
1966	87,466.00			406,500.00	8,100.00
1967	138,647.00	20,000.00	158,647.00	727,000.00	
1968	290,370.00	40,000.00+	330,370.00+	1,135,000.00	17,000.00
1969	297,233.00	60,435.00+	357,668.00+		
1970	362,470.00	127,327.00	489,797.00	1,300,000.00	20,000.00
1971	371,220.00	80,510.00	451,730.00	672,180.00	16,770.00
1972	360,727.00	86,895.00	447,622.00		
1973	827,735.00	150,000.00+	977,735.00	3,600,000.00	32,000.00
1974	1,056,042.00	150,000.00+	1,206,042.00		
1975	899,178.00	165,000.00+	1,064,178.00	2,000,000.00	25,000.00
1976	1,380,229.00	175,000.00 +	1,555,229.00		

1/ Information not available for wages earned during 1964-1966.
2/ Includes wages paid to tenderboat operators, processing plant employees in district.
3/ Based on type of processing when fish were shipped out of the district.

Appendix Table 8. Total utilization of Kuskokwim River king salmon, 1960-1976.

Year	Commercial Catch 1/	Subsistence Catch 2/	Total Utilization
1960	5,969	20,361	26,330
1961	18,918	30,910	49,828
1962	15,341	14,642	29,983
1963	12,016	37,246	49,262
1964	17,149	29,017	46,166
1965	21,989	27,143	49,132
1966	25,545	49,606	75,151
1967	29,986	57,875	87,861
1968	34,278	30,230	64,508
1969	43,997	40,138	84,135
1970	39,290	69,204	108,494
1971	40,274	42,926	83,200
1972	39,454	40,145	79,599
1973	32,838	38,526	71,365
1974	18,664	26,665	45,329
1975	21,720	47,~~784~~ 569	69,504
1976	30,735	57,917	88,652
1977	35,930	≈ 55,	
5 year average	~~30,590~~ 28,682	39,209 42,145	69,799

1/ Subdistricts 335-10, 335-20 and 335-30.
2/ Catches are expanded and include all villages surveyed each year. Data includes a few villages not included in comparative catch tables.

Appendix Table 9. Comparative commercial king salmon catch data by fishing period during the king salmon season, Kuskokwim River (subdistrict 1, 335-10), 1970-1976.

	1970			1971			1972			1973		
Fishing periods (1974)	Catch	Boats	C.F.H.	Catch	Boats	C.F.H.	Catch	Boats	C.F.H.	Catch	Boats	C.F.H.
June												
4-6	3,045	172	0.74									
6-9	7,836	275	1.19							2,752	209	1.09
10-13 (10-11)	13,485	320	1.76							7,419	348	1.78
13-16 (13-14)	13,349	313	3.55 1/	2,436	148	1.37	2,735	184	1.24	7,606	334	1.90
16-20 (17-18)				11,029	306	3.00	8,535	239	2.98	10,417	372	2.33
20-23				12,337	355	2.90	14,356	341	2.34			
23-25				9,619	309	2.59	12,073	297	1.69			
27-28												
Totals	37,715	361	1.70	35,421	418	2.64	37,699	405	2.05	28,194	456	1.86
Associated data												
Fishermen hours		22,164			13,416			18,342			15,156	
Days open to fishing 2/		3 1/2			2			2 3/4			2	
Kuskokwim River Breakup (Bethel)		May 12			May 24			May 23			May 14	
Kuskokwim clear of ice		May 16			May 29			May 28			May 18	
First king salmon		May 21			June 6			June 5			May 27	
Smelt at Bethel		May 27			June 7			June 6			May 31	
First frost		Sept. 7			Sept. 7			Sept. 16			Aug. 13	
Freezeup at Bethel		Oct. 18			Nov. 4			Nov. 3			Oct. 15	

	1974			1975			1976		
Fishing periods (1974)	Catch	Boats	C.F.H.	Catch	Boats	C.F.H.	Catch	Boats	C.F.H.
June									
4-6									
6-9									
10-13 (10-11)	4,384	422	0.9						
13-16 (13-14)	5,790	488	1.0	381	11	5.7			
16-20 (17-18)	5,857	506	1.0	991	40	2.1	6,962	459	2.5
20-23				16,863	463	3.0	13,048	495	4.4
23-35									
27-28									
Totals	16,031	606	0.9	18,235	472	3.0	20,010	561	3.5
Associated Data									
Fishermen hours		16,922			6,102			5,724	
Days open to fishing 2/		1 1/2			1 1/4			1/2	
Kuskokwim River Breakup (Bethel)		May 7			May 19			May 18	
Kuskokwim River Clear of ice		May 19			May 25			May 28	
First king salmon		May 23			May 26			±June 1	
Smelt at Bethel		May 25			May 29				
First frost		SEPT 29							
Freezeup at Bethel					Oct. 29			Oct. 27	

1/ Open for only 12 hours
2/ One day is equivalent to 24 hours fishing time.

Appendix Table 10. Total utilization of Kuskokwim River chum salmon, 1960-1976

Year	Commercial Catch 1/	Subsistence Catch 2/	Total Utilization
1960		327,297	327,297
1961		185,447	185,447
1962		165,626	165,626
1963		141,550	141,550
1964		189,660	189,660
1965		283,459	283,459
1966		174,660	174,660
1967	148	205,263	205,411
1968	187	260,023	260,210
1969	7,165	198,628	205,793
1970	1,664	245,550	247,214
1971	68,914	116,391	185,305
1972	78,619	120,316	198,935
1973	148,746	179,259	328,005
1974	171,887	277,170	449,057
1975	181,840	176,389	358,229
1976	177,864	223,792	401,656
5 yr. average	130,001	173,905	303,906

1/ Subdistricts 335-10 and 335-20.
2/ Catches are expanded and include all villages surveyed each year, 335-10, 335-20 and 335-30.

Appendix Table 11. Comparative commercial chum salmon catch data by fishing period during the chum salmon season Kuskokwim River (subdistrict 1, statistical area 335-11), 1971-1976

Fishing periods	1971			1972			1973			1974			1975			1976		
	Catch	Boats	C.F.H. 1/	Catch	Boats	C.F.H.	Catch	Boats	C.F.H.	Catch	Boats	C.F.H.	Catch	Boats	C.F.H.	Catch	Boats	C.F.H.
June 25-27							19,073	202	7.9	27,017	267	16.9						
June 28-30	11,386	150	6.3	9,863	87	9.4	47,258	250	7.9				31,114	253	20.5	42,464	348	20.3
July 1-3	8,949	111		19,084	115	13.8	21,410	242	7.4	55,356	380	12.1	34,417	374	15.3	44,024	415	17.7
July 4-6	17,672	104		19,839	101	16.8	31,056	212	12.2	27,211	282	8.0						
July 7-9	12,603	93					24,593	217	9.4	50,672	376	11.2	38,752	368	17.6	48,669	381	21.3
July 10-12	2,550	18		13,972	113	10.3							39,791	301	22.0	21,153	377	9.4
July 13-15	8,000	69		6,290	80	6.5							20,945	329	10.6	14,176	265	8.9
July 16-18										6,661	190	5.8						
July 19-21	5,989	71																
Total	67,149	216	9.1	69,048	176	11.6	143,390	341	8.7	166,917	467	11.0	165,049	540	16.9	170,486	517	15.9
Associated Data Fishermen hrs. 2/		7,392			5,952			16,476			15,198			9,750			10,716	
Days open to fishing 3/		3.5			2.5			3.0			2.0			1.25			1.25	

1/ Catch per fisherman hour.

2/ Number of fishermen multiplied by hours open to fishing.

3/ One day is equivalent to 24-hours of fishing time.

Appendix Table 12. Comparative commercial coho salmon catch data by week, lower Kuskokwim River (subdistrict 1, stat.area 335-10) 1965-1976.

Date	1965 Catch	Fisher-men	Fisher-man hrs.	C.F.H. 1/	1966 Catch	Fisher-men	Fisher-man hrs.	C.F.H.	1967 Catch	Fisher-men	Fisher-man hrs.	C.F.H.	1968 Catch	Fisher-men	Fisher-man hrs.	C.F.H.
Aug. 1-8	935		828	1.9					5,676	62	3,504	1.6	12,093	111	3,498	3.5
Aug. 9-15	6,508		2,718	2.4	5,439	61	2,796	1.9	24,296	119	10,728	2.3	46,707	198	12,432	3.8
Aug. 12-21	3,164		2,310	1.4	13,281	83	6,600	2.0	22,341	135	10,656	2.1	44,855	201	13,368	3.4
Aug. 19-29	1,093		564	1.9	2,955	70	3,480	0.8	1,397	32	1,344	1.0	19,161	124	6,378	3.0
Aug. 26-Sept. 3	491		144	3.4					1,287	26	1,128	1.1	3,047	54	2,670	1.1
Sept. 3-9													66	2	48	1.4
Totals	12,191		6,564	1.9	21,675	107	12,876	1.7	54,997	147	27,360	2.0	125,929	242	38,394	3.3

Date	1969 Catch	Fisher-men	Fisher-man hrs.	C.F.H.	1970 Catch	Fisher-men	Fisher-man hrs.	C.F.H.	1971 Catch	Fisher-men	Fisher-man hrs.	C.F.H.	1972 Catch	Fisher-men	Fisher-man hrs.	C.F.H.
Aug. 1-8	11,977	138	8,196	1.5	8,308	137	5,934	1.4	699	27	648	1.1	1,480	82	1,968	0.8
Aug. 9-15	36,104	202	12,720	2.8	14,834	222	12,870	1.2	1,670	46	4,416	0.4	9,706	183	17,568	0.6
Aug. 12-21	25,062	171	9,012	2.8	10,879	209	10,416	1.0	764	25	2,400	0.3	9,733	180	17,280	0.6
Aug. 19-29	8,528	131	6,438	1.3	2,930	115	4,494	0.7	2,048	29	2,784	0.7	1,423	61	5,856	0.2
Aug. 26-Sept. 3	266	6	270	1.0	349	22	768	0.5	72	5	480	0.2	237	28	2,688	0.1
Sept. 3-9	16	1	24	0.7												
Totals	81,953	231	36,660	2.2	37,300	266	34,482	1.1	5,253	83	10,728	0.5	22,579	245	45,360	0.5

Date	1973 Catch	Fisher-men	Fisher-man hrs.	C.F.H.	1974 Catch	Fisher-men	Fisher-man hrs.	C.F.H.	1975 Catch	Fisher-men	Fisher-man hrs.	C.F.H.	1976 Catch	Fisher-men	Fisher-man hrs.	C.F.H.
Aug. 1-8	12,605	198	2,376	5.3	9,576	267	3,444	2.8	2,346	148	888	2.6	10,534	286	6,864	1.5
Aug. 9-15	62,928	351	33,696	1.9	59,090	444	31,969	1.9	12,171 2/	293	14,064	0.9	29,728	400	19,200	1.5
Aug. 12-21	39,886	308	22,176	1.8	58,066	396	28,512	2.0	18,020	362	17,376	1.0	28,664	387	18,576	1.5
Aug. 19-29	14,371	248	17,856	0.8	12,301	263	18,936	0.6	33,128	387	18,576	1.8	14,543	300	14,400	1.0
Aug. 26-Sept. 3	867	16	1,152	0.8	5,360	107	7,704	0.7	16,280	274	13,152	1.2	4,420	174	7,308	0.6
Sept. 3-9	136	4	222	0.6	430	25	1,815	0.2								
Totals	130,793	411	77,478	1.7	144,823	516	92,379	1.2	81,945	533	64,056	1.3	87,889	516	66,348	1.3

1/ Catch per fisherman hours.

2/ 8/4-6.

Appendix Table 13. Comparative Kuskokwim River king salmon subsistence catches by village, 1960-1976

Village	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
Kwigillingok, Kipnuk, Kongiganak	250	283	54	229	414	0 1/	205	957	70	385	1,111
Eek	1,474 3/	2,238 3/	1,060 3/	2,697 3/	1,857	2,737	2,872	4,375	2,760	2,037	2,065
Tuntutuliak	226	2,226	842	2,853	1,826	1,978	3,061	3,338	2,026	2,195	3,558
Kasigluk	135	1,215	127	1,302	4/	513	1,875	2,766	1,360	2,888	3,931
Nunapitchuk	683	2,042	848	1,874	636	490	2,875	1,926	1,360	2,279	4,680
Atmauthluak 6/										6/	1,205
Napakiak	1,830	2,573	2,191	3,148	2,677	1,670	3,592	3,922	2,317	3,546	4,960
Oscarville	1,968	282	75	309	339	678	301	1,327	393	457	542
Napaskiak	536	1,258	759	1,569	2,201	1,412	2,935	3,091	1,647	2,227	3,446
Bethel	1,923	4,150	1,378	7,019	4,114	3,342	7,604	11,772	4,900	7,472	17,026
Kwethluk	2,692	3,763	2,329	5,050	3,262	4,538	6,135	6,889	3,549	3,187	7,932
Akiakchak	1,626	3,052	1,800	2,533	3,488	3,952	4,957	5,543	3,415	2,602	7,022
Akiak	1,865	3,159	906	2,869	2,495	1,774	3,941	3,790	1,332	1,275	3,290
Tuluksak	737	1,486	493	1,295	572	1,019	1,559	1,710	1,048	1,131	1,995
Lower Kalskag	961	571	805	2,661	710	841	1,918	1,733	1,463	2,083	2,146
Upper Kalskag	667	1,049	7/	7/	1,143	719	1,333	1,699	1,404	1,623	734
Aniak	1,057	688	185	602	1,104	494	2,002	1,415	467	1,406	2,136
Chuathbaluk	64	54	10	30	74	29	139	217	40	180	219
Napamute	20	16	44	52	134	2	78	60	100	19	22
Crooked Creek	747	518	561	859	1,358	363	1,249	638	77	541	684
Georgetown	10/	10/	10/	10/	10/	10/	12	10/	10/	9	2
Red Devil	10/	40	144	228	314	10/	182	10/	111	142	232
Sleetmute	465	222	9/	9/	9/	491	149	343	200	267	161
Stony River	435	25	31	67	299	101	632	364	191	2,187	105
Totals	20,361	30,910	14,642	37,246	29,017	27,143	49,606	57,875	30,230	40,138	69,204

Village	1971	1972	1973	1974	1975	1976	1960 1973 Average	1974 1976 Average
Kwigillingok, Kipnuk Kongiganak	241	10	75	10/	10/	197	330	~~65.67~~ 66
Eek	1,882	1,969	1,981	2,356	2,110	3,232	2,286	2,566
Tuntutuliak	1,841	3,214	2,859	1,577	3,492	4,807	2,289	3,292
Kasigluk	1,645	1,292	1,864	1,411	1,713	1,613	1,609	1,579
Nunapitchuk	1,970	2,496	2,663	1,165	2,092	2,578	1,916	1,945
Atmauthluak 6/	548	864	1,106	382	1,042	1,159	931	861
Napakiak	1,868	2,009	1,763	1,224	2,864	3,330	2,719	2,473
Oscarville	570	196	586	180	891	623	573	565
Napaskiak	1,916	1,578	2,048	900	2,308	3,566	1,902	~~2,248~~ 2256
Bethel	8,731	8,371	8,898	4,631	11,688	13,215	6,907	9,845
Kwethluk	5,564	5,137	3,444	2,694	3,179	4,193	4,534	3,355
Akiakchak	4,818	3,872	2,592	1,726	3,534	4,915	3,662	3,392
Akiak	2,688	1,899	1,895	1,292	2,837	3,076	2,366	2,402
Tuluksak	1,280	1,318	1,322	883	1,338	1,411	1,212	1,211
Lower Kalskag	2,355	2,604	1,309	1,586	2,755	4,536	1,583	2,959
Upper Kalskag	601	401	938	463	1,752	1,431	1,026	1,215
Aniak	1,076	2,105	1,030	1,952	1,391	1,490	1,126	1,611
Chuathbaluk	179	261	942	674	594	657	174	642
Napamute	17	20	13	6	~~226~~ 16	420	43	~~215~~ 147
Crooked Creek	291	183	269	650	238	264	596	384
Georgetown	0	0	0	9/	10/	10/	4	10/
Red Devil	135	182	138	205	623	195	168	341
Sleetmute	181	69	504	269	256	356	277	294
Stony River	2,521 11/	95	287	439	861	653 11/	524	651
Totals	42,926	40,145	38,526	26,665	47,784 47,569	57,917	38,757	~~44,122~~ 44,052

1/ Included with other vilages.
2/ Does not include 1965
3/ Estimates based on catch data through 1969
4/ Included with Eek
5/ Does not include 1964
6/ New village of Atmau nluak ~~segregated~~ in 1970 from parent village of Nunapitchuk.
7/ Included with Lower Kalskag
8/ Does not include 1962 and 1963
9/ Included with Red Devil
10/ Data not available
11/ includes Lime Village

Appendix Table 15. Comparative subsistence fishing data between families owning and not owning snowmachines, Kuskokwim River, 1967-1976. 1/

Year	Families	People	Dogs	Snow-machines	Average per family					Percent families with snowmachines
					People	Dogs	Snow-machines	Kings	Other Salmon	
1967										
With snowmachine	59	410	288	63	6.95	4.88	1.07	143	355	14
Without snowmachine	359	2,264	1,963	0	6.31	5.47	0	101	404	
1968										
With snowmachine	159	1,100	808	182	6.92	5.08	1.14	70	382	30
Without snowmachine	374	2,247	2,052	0	6.01	5.49	0	51	493	
1969										
With snowmachine	158	1,097	876	189	6.94	5.54	1.20	78	306	45
Without snowmachine	191	1,208	1,173	0	6.32	6.14	0	71	425	
1970										
With snowmachine	287	1,962	1,413	375	6.84	4.92	1.31	121	380	58
Without snowmachine	212	1,201	972	0	5.66	4.58	0	87	413	
1971										
With snowmachine	361	2,459	1,504	494	6.79	4.16	1.37	89	243	74
Without snowmachine	128	734	601	0	5.73	4.70	0	84	278	
1972										
With snowmachine	278	2,096	949	385	7.54	3.41	1.38	76	220	77
Without snowmachine	85	508	328	0	5.98	3.86	0	48	247	
1973										
With snowmachine	343	2,246	1,375	506	6.55	4.00	1.48	79	362	81
Without snowmachine	81	429	283	0	5.15	3.49	0	47	254	
1974										
With snowmachine	337	2,153	1,339	491	6.39	3.97	1.46	47	495	88
Without snowmachine	68	350	158	0	5.15	2.32	0	29	342	

Appendix Table 15. Comparative subsistence fishing data between families owning and not owning snowmachines, Kuskokwim River, 1967-1976. 1/ (Continued)

Year	Families	People	Dogs	Snow-machines	Average per family					Percent families with snowmachines
					People	Dogs	Snow-machines	Kings	Other Salmon	
1975										
With snowmachine	313	2,029	1,252	482	6.55	4.00	1.54	79	309	84
Without snowmachine	59	313	126	0	5.30	2.13	0	62	301	
1976										
With snowmachine	416	2,815	1,578	607	6.77	3.79	1.46	91	340	81
Without snowmachine	78	410	302	0	5.26	3.87	0	60	306	

1/ Unexpanded data.

Appendix Table 16. Comparative Kuskokwim River subsistence fishery data, 1960-1976 4/

Year	Fishing families surveyed		Mean numbers per fishing family										Fishwheels
			People	Dogs		Snow-machines 1/		King Salmon		Other salmon 3/		
1960	247	1,454.83	5.89	6.66	1,645.02			60	14,820	1,074	265,278	2/
1961	342	2,058.84	6.02	6.33	2,164.86			39	13,338	453	154,926	.19
1962	349	2,268.50	6.50	6.30	2,198.70			79	27,571	470	164,030	.18
1963	405	4,186.70	6.14	5.29	2,142.45			87	35,235	351	142,155	.11
1964	394	2,494.02	6.33	5.44	2,143.36			70	27,580	454	178,876	.10
1965	332	1,975.40	5.95	5.45	1,809.45			64	21,248	669	222,108	.08
1966	492	2,907.72	5.91	4.49	2,209.05			91	44,772	320	157,440	.06
1967	472	3,001.92	6.36	5.22	2,463.84	.18	84.96	106	50,032	375	177,000	.06
1968	567	3,532.41	6.23	5.31	3,010.77	.35	198.45	53	30,051	447	253,449	.06
1969	376	2,440.24	6.49	5.51	2,071.76	.53	199.28	78	29,328	385	144,760	.05
1970	514	3,253.62	6.33	4.65	2,390.10	.75	385.50	108	55,512	384	197,376	.02
1971	488	3,186.64	6.53	4.30	2,098.40	1.01	492.88	88	42,944	238	116,144	.01
1972	576	3,905.28	6.78	3.08	1,774.08	1.00	576.00	51	29,376	166	95,616	.02
1973	408	2,672.40	6.55	3.84	1,566.72	1.48	603.84	81	33,048	356	145,248	.02
1974	596	3,719.04	6.24	3.61	2,151.56	1.12	667.52	45	26,820	466	277,736	.02
1975	437	2,801 17	6.41	3.99	1,743.63	1.35	589.95	79	34,523	310	135,470	.02
1976	494	3,225.82	6.53	3.81	1,882.14	1.23	607.62	86	42,484	335	165,490	.02
1977	494	3,097.38	6.27	3.80	1,877.20	1.35	666.90	91	44,954	287	141,778	.01

1/ Snowmachine count started in 1967.
2/ Information not available.
3/ Does not include coho salmon.
4/ Unexpanded data.

Appendix Table 17. Quinhagak subsistence fishery data, 1967-1976 [1/]

Year	Total Fishing Families	Averages Per Fishing Family							
		People	Dogs	Snow-machines	King Salmon	Dog Salmon	Coho Salmon	8 1/2" Nets	5 1/2" Nets
1967	19	6.43	4.00		71	231		.86	1.00
1968	46	5.59	4.07	.28	88	234	380	.48	.54
1969	59	5.38	3.41	.46	27 (1593)	29 (1711)	179	.72	.28
1970	46	6.02	2.76	.74	47 (2162)	110 (5060)		.64	.69
1971	41	5.83	2.37	.73	55 (2,255)	87 (3,567)	36	.54	.73
1972	54	6.41	2.30	.80	56 (3024)	116 (6264)	9	.44	1.00
1973	44	5.80	2.07	.98	61 (2684)	98 (4312)	83	1.02	.98
1974	47	5.53	2.31	1.17	46 (2162)	78 (3666)	87	.63	.74
1975	46	5.86	1.85	1.13	71 (3266)	88 (4048)		1.00	.93
1976	50	5.62	2.2	1.42	44 (2200)	119 (5450)		0.84	1.24
1977									

1/ Expanded data.

Appendix Table 18. Comparative Kuskokwim River drainage king salmon escapement counts.[1/2/]

Kwethluk River				Kisaralik River			
Year	Estimated Count	Area Surveyed[3/]	Survey Rating	Year	Estimated Count	Area Surveyed	Survey Rating
1960	1,320	Upper 40 miles	?	1960	1,104	Entire	Fair
1962	248	Entire	Poor	1962	327	Entire	Poor
1966	516	Upper 35 miles	Fair	1965	194	Below canyon	Poor
1968	800	Entire	Fair	1966	204	Upper 60 miles	Poor
1972	68	Upper 20 miles	Poor	1968	487	Upper river	Fair
1974	88	Upper 30 miles	Poor	1970	531	Airstrip to Quicksilver Cr.	Fair
1975	Few	Lower 40 miles	Poor	1973	152	Airstrip to 1 mi. above falls	Fair
1976	997	40 mi. d.s. from mouth of Canyon Cr.	fair	1974	4	Airstrip to 30 mi. upstream	Poor
				1975	129	Entire	Poor/Fair
				1976	873	10 mi. below foothills to lake	Fair

Aniak River[4/]				Aniak River (above Salmon River)			
Year	Estimated Count	Area Surveyed	Survey Rating	Year	Estimated Count	Area Surveyed	Survey Rating
1960	1,881	Entire	Fair	1966	485	Salmon R. to lake	Fair
1961	497	Entire	Fair	1967	758	Salmon R. to lake	Poor
1962	925	Entire	Fair	1968	783	Salmon R. to lake	Good
1965	646	Mile 20 to lake	Poor	1969	537	Salmon R. to lake	--
1966	2,184	Buckstock R. to lake	Fair	1970	592	Salmon R. to Waterboot Cr.	Fair
1968	1,420	Buckstock to Kipchuk River	Fair	1971	144	Waterboot Creek to Aniak Lake	Poor
1970	1,231	20 mi. below Salmon R. to Waterboot Creek	Fair	1972	93	Salmon R. to lake	Poor
				1973	200	Salmon R. to lake	Poor
1974	196	Entire	Poor	1974	57	Salmon to lake	Poor
1975	202	Entire	Fair	1975	145	Salmon to lake	Fair
1976	281	Kipchuk River to Gemuk Mt.		1976		No information available	

Salmon River				Kipchuk River			
Year	Estimated Count	Area Surveyed	Survey Rating	Year	Estimated Count	Area Surveyed	Survey Rating
1960	223	Entire	Good	1960	513	Entire	Good
1966	141	Lower 25 miles	Poor	1966	491	Lower 22 miles	Good
1970	381	Lower 25 miles	Fair	1967	200	Lower 25 miles	Poor
1972	43	Entire	Poor	1968	319	?	Fair
1973	100	Mouth to Cripple Cr.	Poor	1970	821	Mouth-Cripple Creek	Fair
1974	35	Entire	Good	1974	73	Entire	Good
1975	32	Entire	Fair	1975	94	Entire	Fair
1976	86	mouth to Marvel Creek	Poor	1976	177	Mouth to Big Bend	Fair

Chukowan River						Kogrukluk River		
Year	Estimated Count	Area Surveyed	Survey Rating	Year	Tower Count	Aerial Survey Count	Area Surveyed	Survey Rating
1966	986	Mouth-Gemuk River	Good	1961		214	Entire	Fair
1968	1,260	Mouth-Gemuk River	Fair	1966		1,645	Entire	Good
1970	1,118	Mouth-Gemuk River	Good	1967		1,033	Entire	Poor
1972	163	Mouth-Gemuk River	Poor	1968		2,180	Entire	Fair
1973	229	Mouth-Gemuk River	Fair	1969	2,980	-	-	-
				1970	3,868[5/]	1,598	Entire	Fair
1975	667	Mouth-Gemuk River	Fair	1971	42[5/]	636	Headwater to 15 mi above mouth	Poor
			Fair					
				1972	1,934	476	Entire	Fair
				1973	1,725	610	Entire	Poor
				1974	3,724			
				1975	1,970	1,062	Entire	Fair
1976	727	Entire	Fair	1976	3,261 5,507[5/]	(1976) 518	tower to Maka Creek	fair

1/ All counts are from aerial surveys, except tower counts which are in parenthesis.
2/ Aerial survey counts were made only in main stem of each river listed.
3/ "Entire" usually does not include several miles of the lower sections of streams where turbid water conditions prevent observation of fish.
4/ Includes Aniak River above Salmon River.
5/ Weir count.

SALE OF ROE FROM SUBSISTENCE CAUGHT SALMON IN THE ARCTIC-YUKON-KUSKOKWIM REGION, 1974-1976

REPORT TO THE ALASKA LEGISLATURE
JANUARY 1977

ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF COMMERCIAL FISHERIES
ANCHORAGE, ALASKA

Preface

The sale of roe from subsistence caught salmon has been allowed in the Arctic-Yukon-Kuskokwim region since 1974. Statutes that provide for legalization of these sales expired January 1, 1977. Presumably the legislature intended to thoroughly review this subject in order to determine if subsistence roe sales should be allowed beyond the 1976 season. This report reviews the history, production, economic values and fishery management implications associated with subsistence roe sales.

SALE OF ROE FROM SUBSISTENCE-CAUGHT SALMON IN THE ARCTIC-YUKON-KUSKOKWIM REGION

Introduction

In years past when native people were experiencing a traditional or "pure" subsistence type of livelihood, all or nearly all portions of fish captured were probably utilized. Salmon roe, a fish by-product, was consumed by people with probably greater quantities fed to their sled dogs. Due to recent changes in employment and welfare opportunities, there has been a gradual decline in the dependence upon subsistence fishing in many areas. Replacement of sled dogs with snowmachines has also been a very important influence on the decline in utilization of salmon and salmon roe. From reports received from various village residents, much of the roe from subsistence caught salmon was discarded in the recent years prior to 1974. Actual amounts of salmon roe either discarded or utilized during these earlier years were never documented.

There are many problems involving the documentation of the amount of roe utilized and/or wasted in the subsistence fishery. It is believed that some native fishermen continued to store or dry their salmon roe with the intention of some future use, but significant amounts were probably never used. Most fishermen would be hard pressed to quantify the amount of roe retrieved from their salmon catch, the amount consumed or the amount wasted.

Initial interest in permitting sales of subsistence caught salmon roe came from commercial salmon buyers. Beginning with the 1973 season, most Kuskokwim area buyers and a few buyers in the upper Yukon illegally augmented their roe production to some extent from subsistence fishing channels. It was estimated that illegal purchases of subsistence salmon roe represented 10-15 percent of the reported commercial roe production for the Kuskokwim area in 1973.

Three different bills were introduced in the 1974 Legislature that involved legalization of the sale of subsistence caught salmon roe. None of these bills passed as they remained in committee through adjournment.

In the spring of 1974 it was apparent that several commercial salmon buyers were gearing up to illegally purchase even larger amounts of subsistence roe. Both the Deparments of Fish and Game and Public Safety assigned additional personnel for fishery patrol in an attempt to minimize the illegal purchases of subsistence roe. The major thrust of the enforcement program consisted of increased surveillance of buying and processing stations. News releases and notices were issued to clarify existing regulations.

An emergency regulation with an effective date of June 15, 1974 was issued by the Commissioner which allowed the unrestricted sale of salmon roe obtained as an unavoidable product of legal subsistence fishing throughout the entire A-Y-K region. Issuance of the emergency regulation, in effect for 120 days, was coincidental with the beginning of the salmon runs.

In 1975 the Legislature finally adopted an Act (Appendix 1) with an effective date of May 29 that legalized subsistence salmon roe sales only in the A-Y-K region. These statutes contain the following important provisions:

1. Expiration date is January 1, 1977. Sales after this date will presumably depend on further legislative review and action.
2. No person may purchase or trade for subsistence salmon roe unless he possesses an annual permit issued by the Commissioner.

3. The Commissioner may close any or all areas to the sale of subsistence salmon roe if the waste of carcasses, damage to stocks or circumvention of management programs is occurring. A separate section defining the "waste of salmon" and penalties for violators was included.

4. If the subsistence catch in an area exceeds or is likely to exceed by 10 percent the 1974 subsistence catch for that area, the Commissioner shall close that area to the sale of subsistence salmon roe.

5. The Board of Fisheries may adopt regulations necessary to allow the sale of roe based on traditional subsistence needs coupled with the maintenance of salmon stocks on a sustained yield basis.

In order to administer the legislation, the Commissioner issued an emergency regulation in June of 1975. This emergency regulation (Appendix 2) contained provisions pertaining to permitting and reporting requirements in addition to prohibiting subsistence roe sales in areas where the salmon runs were especially vulnerable or where recent subsistence salmon catches were negligible.

The Board of Fisheries in December of 1975 adopted regulations for the 1976 season that were similar to the provisions contained in the aforementioned emergency regulation. The Board regulations contain an additional important provision which provides that sale of subsistence roe may be prohibited when the subsistence catch exceeds or is likely to exceed the 1970-74 average annual harvest in any district or subdistrict. These regulations (Appendix 3) will remain in effect indefinitely unless changed by future Board action or superceded by legislation.

Description of Subsistence Roe "Fishery"

Present Board of Fisheries' regulations allow the sale of subsistence salmon roe only in the main Yukon River, main Tanana River downstream of the Chena River, main Kuskokwim River downstream of the Kolmakoff River, Goodnews Bay and at Quinhagak (subdistrict 4 of the Kuskokwim area). Although permitted over a greater portion of the region in 1974 and 1975, the vast majority of sales occurred in the aforementioned areas.

Table 1 presents information on the poundages of subsistence roe sold, number of persons making sales and economic values for each management area. Locations of the various management areas are shown in Figure 1. Chum salmon roe comprised approximately 75 percent (by weight) of all sales with the remainder being king salmon roe. Small amounts of roe from the other salmon species are sold and these are included in the chum salmon totals.

Record roe sales were made in 1976 totaling 232,000 pounds of all species. A total of 182,000 and 156,000 pounds was sold in 1974 and 1975 respectively. Record sales were also made in 1976 from the standpoint of fishermen sales ($431,000), average earnings ($261) and first wholesale value ($862,000).

The numbers of persons making roe sales each year ranged from 1425-1650. In 1976 it was determined that of the 1650 persons that sold roe, just under one-half (699) held an entry permit and probably fished commercially also. All persons that made sales were probably not fishermen since it was common practice for the parents to give roe to their children to sell.

Although 20 subsistence roe buyers operated in the region during 1976, the 4 major buyers processed 75 percent (by weight) of all roe purchased. Prices paid to Kuskokwim River fishermen (average $2.12/lb

in 1976) have been substantially greater than prices paid to Yukon fishermen (average $1.38/lb in 1976). First wholesale prices are based on 1975 values and are probably low.

Table 2 shows subsistence roe data recorded during 1974-76 for each sub-area. The greatest amounts of roe were sold in the following sub-areas: lower Kuskokwim River (63% by weight), mid-Yukon River (17%) and Tanana River (10%). Small amounts were sold in the lower and upper Yukon river areas and in some coastal villages. The small subsistence fisheries or remote locations of these latter areas make it uneconomical to transport the roe long distances to central processing plants.

Since subsistence fishing occurs in many widely scattered villages and fish camps, the roe buyers have developed an extensive collection system. Buyer representatives are placed in most villages and the larger fish camps where subsistence roe sales are permitted. Fishermen are given plastic buckets in which to place roe and these are transported almost daily by boat or aircraft to processing plants, most of which are located in Bethel, Galena, Nenana and Fairbanks. For the most part, processing is done by Japanese technicians who salt and pack the roe using conventional methods required for marketing in Japan.

Due to the extensive nature of the subsistence fishery, the monitoring of roe sales is a formidable task. Accurate and timely information regarding the amounts of roe sold is essential since sales are prohibited when subsistence harvests exceed levels specified in the regulations. For example, with subsistence fishing occurring from five to seven days a week, as much as 45,000 pounds of roe representing a subsistence catch of nearly 100,000 fish can be made in the Kuskokwim River during a single week. Pounds of roe sold daily and weekly are obtained from

written reports and special roe tickets provided by buyers.

Since statehood, annual subsistence harvests have been obtained by comprehensive surveys made at the end of the fishing season. Present regulations require that estimates of in-season catches also be obtained. This is accomplished by translating pounds of subsistence roe sold to numbers of fish using sex ratio and average roe weight information.

Several emergency orders were issued prohibiting subsistence roe sales in various subdistricts when subsistence catch levels or "quotas" specified in the regulations were attained. These "quotas", which have been utilized for management purposes since 1975, represent traditional recent harvests made prior to the legalization of subsistence roe sales. Subsistence fishing could continue after roe sales were prohibited, but it was observed that effort often declined sharply thereafter.

Table 3 compares the catch "quota" (1970-74 average catch or 1974 catch +10%) with catch estimates from roe sales and actual catches from the end of the season survey. Large differences between these catches were generally the result of roe not being sold from all salmon captured and catches made after roe sales were prohibited. Subsistence roe sales in the Kuskokwim River during 1976 should have been prohibited earlier in the season, but the staff encountered problems in making timely and accurate estimates of the catch. To alleviate this problem, the Board of Fisheries recently adopted regulations requiring buyers to submit reports to the Department twice a week instead of once a week.

Management Considerations

Traditionally, the subsistence salmon fishery was naturally limited by personal food requirements and the numbers of salmon that could be handled in a day and hung to dry or smoke during the season. These restraints do not apply to any fishery where the profit motive can be paramount. For example, a Kuskokwim River subsistence fisherman cur-

rently is paid approximately $6.80 and $1.58 for the roe sold from a single king and chum salmon respectively. These prices are only slightly less than what the carcass of these species are worth to a commercial fisherman in the same area. The high value of subsistence salmon roe is an incentive for some individuals - buyers and fishermen - to risk violating either the intent or legal wording contained in existing statutes and regulations. Wastage, misuse and overfishing of the salmon resource were documented for specific times and locations during the past three seasons. Increased violations or erosion of management control could jeopardize future maintenance of salmon stocks on a sustained yield basis.

During 1974-76 the Department received twelve documented reports or complaints from local residents concerning intentional wastage of salmon carcasses during the fishing season. These reports involved persons observed throwing carcasses into the river and piles of rotting carcasses. During this same time, department personnel documented only two instances of intentional wastage, both involving carcasses left to rot on the beach. These discarded carcasses contained females that had been stripped of their roe. In most instances the names of persons involved could not be determined. The problem of carcass disposal during the fishing season apparently declined during the last two seasons. This was probably the result of publicizing wanton waste provisions and penalties, placement of additional department employees to monitor sales in key villages and social pressures exerted by law-abiding local residents.

Another difficult to detect but potentially greater form of wastage exists. Large quantities of dried salmon captured the previous summer were observed by Department personnel in caches and smokehouses of several Kuskokwim villages during the spring of 1975. Due to the very poor condition of these fish, most were probably thrown away since the

current year salmon run was just beginning. Often the portion of the catch in excess of real need is stored in the open and is very susceptible to spoilage. Again, local residents have reported that this form of wastage does occur in some Yukon and Kuskokwim River communities.

Unintentional wastage of fish due to improper curing and storage methods coupled with adverse weather conditions has always been associated with the subsistence fishery. Compared to the amounts of salmon presently utilized for food wastage that is traceable to subsistence roe sales is probably relatively insignificant.

New areas being fished, fishing late at night, cessation of fishing after subsistence roe sales have been prohibited and substantially larger catches were documented for specific times and locations during the last three seasons. This is indicative of changing subsistence fishing patterns including increased effort.

Yukon River harvests of chum salmon, the most abundant species in the region, declined during 1966-73 due to increased cash income and fewer sled dogs. Kuskokwim River catches did not exhibit a similar decline during this period. During 1974-76, when subsistence roe sales were permitted, the average annual chum salmon catch increased 70 percent in the Kuskokwim River and 50 percent in the Yukon River when compared to the previous three year averages (Table 4). In the upper Kuskokwim River (upstream of Chuathbaluk), where subsistence roe sales were prohibited, the average annual catch made during 1974-76 increased only 20% compared to the previous three year average. In the Koyukuk River system, where roe sales were prohibited, the increased 1974-76 catch was similar to that for portions of the Yukon River drainage open to subsistence roe sales. Subsistence catches made during the last three years were also

influenced by the magnitude of the chum salmon runs which were considered above average. Based on existing data and observations, it is believed that the increased catches were influenced by both larger runs and greater fishing effort.

There are some indications that subsistence fishermen are exerting more effort during the early portion of the season (and runs) which may be in response to competing with other fishermen for an increased share of the subsistence roe sales. Figure 2 shows seasonal catch patterns for the Kuskokwim River during and prior to the legalization of subsistence roe sales. Generally these graphs show catches were made during a longer time span during years when roe sales were not allowed. The 1964 season was an exception, but the run that year was exceptionally late and of short duration. If this trend of greater fishing effort early in the season continues, then measures will have to be taken to spread subsistence harvests throughout the run to prevent overharvesting of specific stocks. This will require additional weekly closures.

A possible consequence resulting from the authorization of the sale of subsistence caught salmon roe is that the concept and management of subsistence fishing may be permanently altered. Present subsistence fishing regulations in the A-Y-K region are quite liberal which is in recognition of the traditional personal needs of the large native population. If the problems cited in this section continue, then the state policy which assigns the highest priority among beneficial uses to subsistence fishing must be re-examined. Most salmon populations are being harvested at maximum levels, and an increase in subsistence fishing effort and utilization must be countered with additional restrictions on subsistence fishing, commercial fishing or on both fisheries. If subsistence fishing requires further definition and restriction, many persons with genuine subsistence needs will be adversely affected by

others who are much less dependent on a subsistence livelihood, but continue to fish mainly for the purpose of selling roe. This concern has been expressed to Department personnel on occasion by several long term residents, who still fully utilize their catch for traditional use. These persons are opposed to the sale of subsistence roe because they feel it threatens their traditional life style.

The Department received an additional $19,000 in FY77 (July 1, 1976-June 30, 1977) to monitor the subsistence roe "fishery". Although three seasonal fishery technicians were hired, it was estimated that Yukon and Kuskokwim area biologists still devoted approximately one-quarter of their time to some aspect of monitoring roe sales during the 1976 fishing season. Thus less time was afforded biological studies and management of commercial fisheries.

Recommendations

It is not the purpose of this report to recommend whether or not subsistence roe sales should be extended beyond the 1976 season. The issues are very complex and require careful examination of economic and social as well as biological factors.

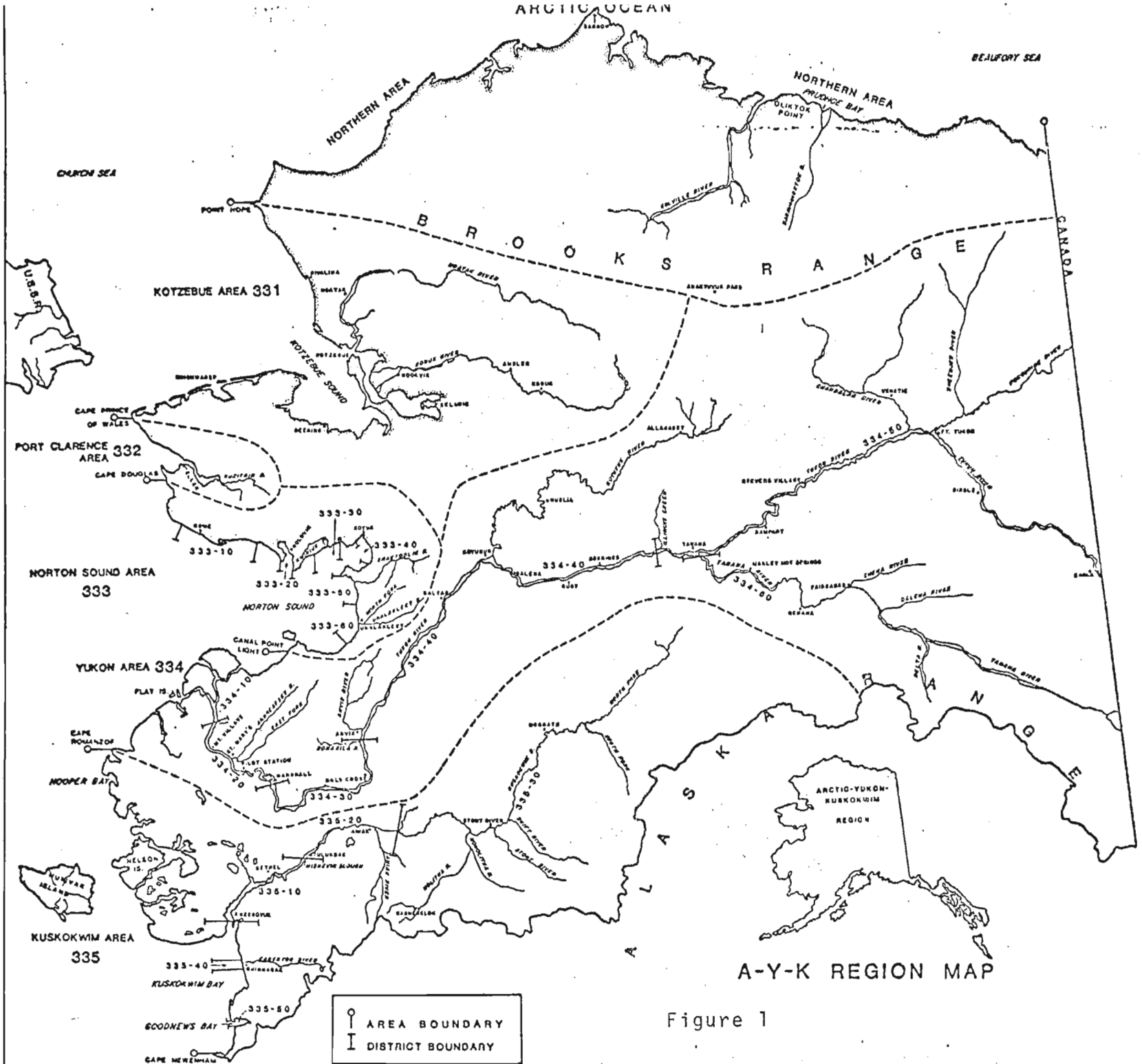
The Department cannot predict in quantifiable terms what effects continued subsistence roe sales will have on the fishery and salmon resource. Based on current information and trends, there is a strong likelihood that additional fishing restrictions will be necessary.to manage the roe "fishery". The extent of changes in regulations or management strategies will be dependent on the extent of problems associated with future subsistence roe sales.

Statutory or regulatory prohibition of future subsistence roe sales will not necessarily eliminate such sales. Due to the small staff, remoteness and vast size of the region and the existence of subsistence fisheries within major commercial fishing areas, blackmarketing of roe would be difficult

to control. The Kuskokwim River fishery would be easier to control in this regard than the upper Yukon-Tanana River fishery.

The following recommendations should be considered only if the Legislature approves future subsistence roe sales:

1. These roe sales must continue to be regarded as an experiment and should not be given more than a two year extension. Many questions concerning this subject cannot now be determined and will require additional time for data collection and to more clearly distinguish trends in subsistence utilization. This should also enhance regulatory and statutory compliance on the part of all fishery participants.
2. An annual Department report covering all aspects of this subject should be submitted to the Legislature for determining necessary changes to enabling legislation.
3. Criteria and procedures involving revocation of permits issued to buyers of subsistence salmon roe should either be clarified or implemented. An existing Board of Fisheries regulation states that "any permittee who violates the terms of his permit or any other regulation or provision of law may have his permit revoked immediately by the Commissioner". Experience has shown that permit revocation is not easily accomplished. Permit revocation is an important deterrent and, to remain effective, must be initiated when serious violations occur.
4. Existing Board of Fisheries regulations controlling sale of subsistence salmon roe should be maintained.



A-Y-K REGION MAP

Figure 1

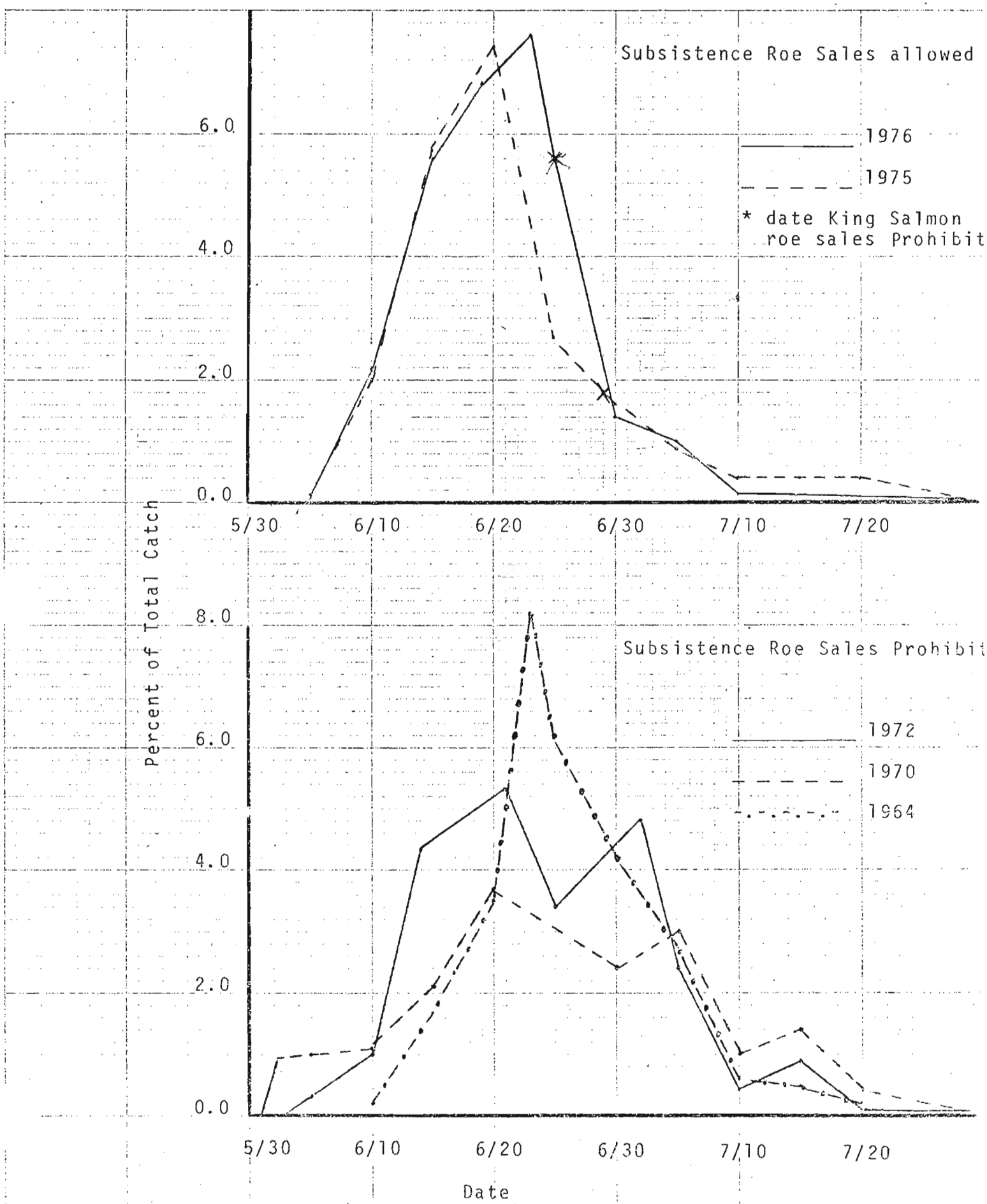


Figure 2. Kuskokwim River (subdistrict 1) daily subsistence king salmon catches

Table 1. Subsistence salmon roe sale information by management area and year, Arctic-Yukon-Kuskokwim Region, 1974-76.

Pounds of raw product	1974 Kuskokwim	1974 Yukon	1974 Total	1975 Kuskokwim	1975 Yukon	1975 Total	1976 Kuskokwim	1976 Yukon	1976 Total
King	34,581	717 1/	35,298	24,399	2,467	26,866	61,714	5,830	67,544
Chum	98,602	48,528 1/	147,130	57,711	71,328	129,039	95,389	68,647	164,046
Total	133,183	49,245 1/	182,428	82,110	73,795	155,905	157,103	74,487	231,590
Value of Sales	$180,000	$ 37,000 2/	$ 217,000 2/	$124,000	$ 85,000	$209,000	$334,000	$ 97,000	$431,000
Number of persons reporting sales	1,438	186 2/	1,624 2/	1,200	225	1,425	1,321	329	1,650
Average sales value per person	$ 125	$ 191 2/	$ 133 2/	$ 103	$ 378	$ 147	$ 253	$ 295	$ 261
Number of processors	4	11	15	4	14	18	6	14	20
First wholesale value 3/	$360,000	$74,000	$434,000	$248,000	$170,000	$418,000	$668,000	$194,000	$862,000

1/ Includes small amounts of roe taken in Norton Sound.

2/ Does not include small undetermined number of Norton Sound Fishermen.

3/ Based on 2x that of fishermen value.

Table 2. Subsistence salmon roe sale information by sub-areas, Arctic-Yukon-Kuskokwim region, 1974-1976 1/

	Pounds of King Salmon Roe	Pounds of Chum Salmon Roe	Value of Sales	Number of persons reporting sales	Value of sales per person
Kuskokwim Area					
Kuskokwim River					
Mouth to Akiak	33,859	66,710	$170,473	1,055	$162.00
Upstream of Akiak	4,179	16,144	36,323	169	215.00
Totals	38,038	82,854	$206,796	1,224	$169.00
Quinhagak	2,047	1,096	$ 5,397	95	$ 57.00
Goodnews Bay	163	2	$ 222	2/	2/
Hooper Bay	0	34	51	1	51.00
Area Totals	40,085	83,984	$212,244	1,320	$277.00
Yukon Area					
Lower Yukon River (mouth-Holy Cross)	955	3,955	$ 5,598	43	$130.00
Mid-Yukon River (Anvik-Ruby)	197	31,501	34,616	108	321.00
Upper Yukon River (Upstream of Tanana)	972	10,985	12,330	51	242.00
Tanana River	798	17,048	20,062	45	446.00
Area Totals	2,922	63,489	$ 72,606	247	$294.00
Norton Sound Area 2/	249	1,627	3/	3/	3/

1/ All data represents averages for 1974-76.
2/ Sales occurred only during 1974.
3/ Information not available.

Table 3. Comparison of estimated and recorded subsistence salmon catches to "quotas", AYK Region, 1974-76. (1976 actual catches are preliminary).

	Kuskokwim River (subdistricts 1 & 2		
King Salmon	1974	1975	1976
"Quota" 1/	None	27,600	27,600
Estimated Catch 2/	20,300	32,000	43,000
Actual Catch 3/	25,100	45,400	59,600
Chum Salmon			
"Quota" 1/	None	169,800	169,800
Estimated Catch 2/	313,000	185,100	246,100
Actual Catch 3/	260,900	158,300	205,700

	Yukon River (excluding Yukon Territory)		
King Salmon	1974	1975	1976
"Quota" 1/	None	17,050	17,050
Estimated Catch 2/	687	2,363	3,533
Actual Catch 3/	15,741	13,874	12,185
Chum Salmon			
"Quota" 1/	None	207,491	207,491
Estimated Catch 2/	97,056	142,656	171,567
Actual Catch 3/	238,149	210,622	238,702

1/ "Quotas" established by Department in 1975 and adopted as Board regulations in 1976: subsistence roe sales prohibited when king salmon catches exceed 1974 recorded catches by 10% and when chum salmon catches exceed 1970-74 average annual recorded catches.

2/ Catches estimated from lbs. of subsistence roe sold using sex ratio and average roe weight per fish information.

3/ Catches from systematic personal interview and survey of subsistence fishermen conducted at end of fishing season.

Table 4. Annual subsistence salmon catches made during 1964-1976 in portions of the Kuskokwim and Yukon Rivers where subsistence roe sales occurred in 1974-76.

Year	Kuskokwim River 1/		Yukon River 2/	
	King Salmon	Chum Salmon 3/	King Salmon	Chum Salmon 3/
1964	26,912	142,277	19,480	460,712
1965	26,186	236,197	16,950	436,306
1966	47,304	142,129	11,507	204,913
1967	56,470	166,896	16,306	256,926
1968	29,551	216,022	11,883	170,522
1969	36,973	165,233	13,916	195,476
1970	66,807	218,985	13,474	199,163
1971	39,781	101,170	21,670	171,247
1972	39,596	103,025	17,079	119,335
1973	37,315	164,992	19,458	167,106
1974	25,096	260,912	16,584	256,636
1975	45,365	158,257	14,155	250,054
1976 4/	59,629	205,676	12,095	190,225
1977				

1/ Mouth to Chauathbaluk.

2/ Mouth to Fort Yukon and Tanana River (does not include Fairbanks).

3/ Includes small numbers of the other salmon species.

4/ Preliminary data.

Appendix I

LAWS OF ALASKA

1975

Source: SB 451 am

Chapter No.: 99

AN ACT

Relating to the sale of subsistence caught salmon eggs; and providing for an effective date.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF ALASKA:

* Section 1. INTENT. (a) It is the intent of sec. 2 of this Act to permit the sale or trade of salmon roe in the Arctic-Yukon-Kuskokwim District under strict permit and regulatory provisions to assure the health of subsistence economies in areas where such use will not jeopardize or interfere with the maintenance of existing salmon stocks.

(b) It is the intent of sec. 3 of this Act to control the waste of salmon resources.

* Sec. 2. AS 16.05 is amended by adding a new section to read:

Sec. 16.05.827. SALE OF SUBSISTENCE SALMON ROE. (a) Notwithstanding sec. 940(17) of this chapter, the board may adopt regulations permitting the sale of subsistence salmon roe under conditions the board considers advisable.

(b) The board may permit subsistence salmon roe sales under (a) of this section if

(1) the accustomed contribution of salmon to particular subsistence economies will be maintained, as modified by current needs; and

(2) subsistence salmon roe sales will not jeopardize or interfere with the maintenance of salmon stocks on a sustained yield basis.

(c) No person may purchase or trade for or attempt to purchase or trade for subsistence salmon roe unless he

possesses an annual permit issued by the commissioner. The commissioner may specify terms and conditions of a permit required under this section. No license, entry permit or interim permit is required for the specific act of selling subsistence salmon roe. No person may purchase or transport or attempt to purchase or transport salmon roe which he knows or has reason to know was taken in violation of this section or regulations adopted under it.

(d) If the commissioner finds that sale of subsistence salmon roe is resulting in waste of salmon carcasses, damage to salmon stocks, or circumvention of salmon management programs, he may close any or all areas to subsistence salmon roe sale by emergency order. If the commissioner finds that the subsistence catch in an area exceeds or is likely to exceed, by 10 per cent, the 1974 subsistence catch for that area, he shall close that area to subsistence salmon roe sale by emergency order.

(e) Original purchasers of subsistence salmon roe shall record information required by the department on fish tickets supplied by the department.

(f) The board may adopt regulations it considers necessary for the administration of this section. The board may delegate its authority under this section to the commissioner.

(g) A person who violates this section or a regulation adopted under it is punishable by a fine of not more than $10,000, or by imprisonment for not more than six months, or by both.

(h) In this section, "subsistence salmon roe" means salmon roe incidentally obtained as an unavoidable by-product of lawful subsistence fishing.

* Sec. 3. AS 16.05 is amended by adding a new section to read:

Sec. 16.05.831. WASTE OF SALMON. (a) It is unlawful for a person to waste salmon intentionally, knowingly, or with reckless disregard for the consequences. In this section, "waste" means the failure to utilize the majority of the carcass, excluding viscera and sex parts, of salmon which are to be

(1) sold to a commercial buyer or processor;

(2) utilized for consumption by humans or domesticated animals; or

(3) utilized for scientific, educational, or display purposes.

(b) The commissioner may authorize other uses of salmon upon request if he finds that to do so would be consistent with maximum and wise use of the resource.

(c) A person who violates this section or a regulation adopted under it is punishable by a fine of not more than $10,000, or by imprisonment for not more than six months, or

by both. In addition, a person who violates this section is subject to a civil action by the state for the cost of replacing the salmon wasted.

* Sec. 4. Sections 1(a) and (2) of this Act expire January 1, 1977.

* Sec. 5. This Act takes effect immediately in accordance with AS 01.10.070(c).

Approved by governor: May 29, 1975
Actual effective date: May 30, 1975

NOTICE OF ADOPTION OF EMERGENCY ...

Pursuant to the Administrative Procedure Act (Alaska Statutes 44.62) notice is hereby given that the Alaska Board of Fish and Game has adopted the following emergency regulations:

REGULATIONS PERMITTING THE SALE OF
SUBSISTENCE CAUGHT SALMON ROE
IN THE ARCTIC-YUKON-KUSKOKWIM AREA

CHAPTER 3. ARCTIC-YUKON-KUSKOKWIM AREA

ARTICLE 8. PURCHASE AND SALE OF SALMON ROE

5 AAC 03.805. SALE OF SALMON ROE. (a) Salmon roe incidentally obtained as an unavoidable by-product of the lawful subsistence fishing may be purchased or sold in accordance with the provisions of AS 16.05.827 and the provisions of this section and sec. 810 of this chapter.

(b) Each person, company, firm or other organization who purchases or processes subsistence-caught salmon roe shall obtain an annual permit issued by the commissioner or his authorized representative. Permits must be in the possession of the permittee at all times. Permits shall be obtained by the permittee in person from a representative of the department at least two days prior to purchasing or processing any subsistence-caught salmon roe. A separate permit must be obtained for each district, as described in sec. 200 of this chapter, in which purchases are made. No person may initiate any purchase of, or accept any subsistence-caught salmon roe, unless that person has a valid permit for the district.

(c) Purchasers of subsistence-caught salmon roe shall complete all purchases on the basis of the price per pound of unprocessed roe.

(d) Any permittee who violates the terms of his permit or any other regulation or provision of law may have his permit revoked immediately by the commissioner.

(e) Each person, company, firm or other organization who purchases or processes salmon roe shall submit weekly reports to a local representative of the department containing the following information:

(1) weight in pounds by species of unprocessed subsistence-caught salmon roe purchased;

(2) weight in pounds by species of unprocessed commercially-caught salmon roe purchased; and

(3) number of whole salmon by species purchased from commercial fishermen.

(f) Information required by (c) of this section shall be in the form of totals for the previous week and for the entire season to date.

(g) Permittees shall record information of each purchase of subsistence-caught salmon roe on fish tickets provided by the department. All entries on the fish ticket shall be completed by the permittee. Fish tickets required by this section may not be used to record information pertaining to purchases of commercially-caught salmon or salmon roe. Fish tickets required by this section shall be completed at the time the transfer of roe to the permittee is made. A copy of each fish ticket shall be given to the fisherman selling the roe and to the local representative of the department.

(h) All purchases of subsistence-caught salmon roe shall be made from the fisherman who took the salmon or a member of his immediate household. No person may act as a sales agent or in a similar capacity for purposes of vending subsistence-caught salmon roe to any permittee or other person.

(i) If the commissioner closes any district, subdistrict, or other area to subsistence-caught roe sales, no person shall initiate, enter into, or consummate any purchase agreement within the closed area for subsistence-caught roe after the closure becomes effective.

(j) No person shall enter into, initiate, or consummate any purchase agreement for any subsistence-caught salmon roe in any district or subdistrict which is closed to sale of subsistence-caught salmon roe. No permittee may purchase or process roe from any subsistence-caught salmon which he knows or has reason to know were taken from waters described in sec. 810 of this chapter.

(k) As used in this section, "purchase" means to buy, trade for, or otherwise receive subsistence-caught salmon roe for valuable consideration. No person may give or receive without valuable consideration subsistence-caught salmon roe.

(l) In areas open to the sale of subsistence-caught salmon roe, salmon taken for subsistence purposes must be consumed by the fisherman taking the fish or by a member of his immidiate household.

5 AAC 03.810. SALMON ROE SALES PROHIBITED. No person may sell, trade, purchase, give, transport, or attempt to do any of the foregoing with salmon roe from salmon taken from any of the following waters:

(1) all waters in the Northern and Port Clarence districts;

(2) in the Norton Sound district, all waters listed under sec. 350 of this chapter and all rivers and streams within 500 yards of their termini as defined in 5 AAC 39.975(14);

(3) in the Yukon district, all waters listed under sec. 350 of this chapter;

(4) in the Kuskokwim district, all waters listed under sec. 350 of this chapter except the lower portions of the Eek, Kwethluk, and Kisaralik rivers as indicated by stream markers placed by the department;

(5) in any waters closed to subsistence salmon fishing.

ARTICLE 8.
PURCHASE AND SALE OF SALMON ROE

Section
805. Sale of salmon roe
810. Salmon roe sales prohibited

5 AAC 03.805. SALE OF SALMON ROE. (a) Salmon roe incidentally obtained as an unavoidable by-product of lawful subsistence fishing may be purchased or sold only in accordance with the provisions of AS 16.05.827 and the provisions of this section and sec. 810 of this chapter.

(b) Each person who purchases or processes subsistence-caught salmon roe shall obtain an annual permit issued by the commissioner or his authorized representative. Permits must be retained in the possession of the permittee and readily accessible for inspection at all times. Permits shall be obtained by the permittee in person from a representative of the department at least 48 hours prior to purchasing or processing any subsistence-caught salmon roe. A separate permit must be obtained for each district, as described in sec. 200 of this chapter, in which purchases are made. No person may initiate any purchase of or accept any subsistence-caught salmon roe, unless that person has a valid permit for the district. Permits may designate requirements for weekly reports, roe ticket reporting, times and areas open to sale or processing and plant inspection.

(c) Purchasers of subsistence-caught salmon roe shall complete all purchases on the basis of the price per pound of unprocessed roe.

(d) Any permittee who violates the terms of his permit or any other regulation or provision of law may have his permit revoked immediately by the commissioner.

(e) Each person who purchases or processes salmon roe shall submit weekly reports to a local representative of the department containing the following information:

(1) weight in pounds by species of unprocessed subsistence-caught salmon roe purchased;

(2) weight in pounds by species of unprocessed commercially caught salmon roe purchased; and

(3) number of whole salmon by species purchased from commercial fishermen.

(f) Information required by (e) of this section must be in the form of totals for the previous week and for the entire season to date.

(g) Permittees shall record information for each purchase of subsistence-caught salmon roe on roe tickets provided by the department. All entries on the roe ticket shall be completed by the permittee. Roe tickets required by this section may not be used to record information pertaining to purchases of commercially caught salmon or salmon roe. Roe tickets required by this section shall be completed at the time the transfer of roe to the permittee is made. A copy of each roe ticket shall be given to the fisherman selling the roe and to the local representative of the department.

(h) Unless waived by stipulations contained in the permit required by this section, permittees shall comply with provisions of 5 AAC 39.130(a) and (b). Fish ticket requirements in 5 AAC 39.130(h) apply to roe tickets.

(i) All purchases of subsistence-caught salmon roe may be made only from the fisherman who took the salmon or a member of his immediate household. No person may act as a sales agent or in a similar capacity for purposes of vending subsistence-caught salmon roe to any permittee or other person.

(j) The sale of subsistence-caught salmon roe will be prohibited by emergency order in any district or subdistrict when the subsistence salmon catch exceeds or is likely to exceed the 1970-74 average annual harvest. In no instance will the sale of subsistence-caught roe be allowed to continue in any district or subdistrict if the subsistence salmon harvest exceeds or is likely to exceed the 1974 subsistence harvest by 15 percent.

(k) If the commissioner closes any district, subdistrict, or other area to subsistence-caught roe sales, no person may initiate, enter into, or consummate any purchase agreement within the closed area for subsistence-caught roe after the closure becomes effective.

(l) No person may enter into, initiate, or consummate any purchase agreement for any subsistence-caught salmon roe in any district or subdistrict which is closed to sale of subsistence-caught salmon roe. No permittee may purchase or process roe from any subsistence-caught salmon which he knows or has reason to know were taken from waters described in sec. 810 of this chapter.

(m) As used in this section, "purchase" means to buy, trade for, or otherwise receive subsistence-caught salmon roe for valuable consideration. No person may give or receive without valuable consideration subsistence-caught salmon roe.

(n) In areas open to the sale of subsistence-caught salmon roe, salmon taken for subsistence purposes must be consumed by the fisherman taking the fish or by a member of his immediate household.

Authority: AS 16.05.827

5 AAC 03.810. SALMON ROE SALES PROHIBITED. No person may sell, trade, purchase, transport, or attempt to do any of these acts with roe from subsistence-caught salmon taken from any of the following waters:

(1) all waters in the Northern, Kotzebue, Port Clarence and Norton Sound districts;

(2) in the Yukon district, all waters listed under sec. 350 of this chapter;

(3) in the Kuskokwim district, all waters listed under sec. 350 of this chapter except in the lower portions of the Eek and Kwethluk Rivers as indicated by stream markers placed by the department;

(4) in any waters closed to subsistence salmon fishing.

Authority: AS 16.05.827

Appendix Table 13. Comparative Kuskokwim River king salmon subsistence catches by village, 1960-1976

Village	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
Kwigillingok, Kipnuk, Kongiganak	250	283	54	229	414	0[1]	205	957	70	385	1,111
Eek	1,474[3]	2,238[3]	1,060[3]	2,697[3]	1,857	2,737	2,872	4,375	2,760	2,037	2,065
Tuntutuliak	226	2,226	842	2,853	1,826	1,978	3,061	3,338	2,026	2,195	3,558
Kasigluk	135	1,215	127	1,302	[4]	513	1,875	2,766	1,360	2,888	3,931
Nunapitchuk	683	2,042	848	1,874	636	490	2,875	1,926	1,360	2,279	4,680
Atmauthluak[6]											1,205
Napakiak	1,830	2,573	2,191	3,148	2,677	1,670	3,592	3,922	2,317	3,546	4,960
Oscarville	1,968	282	75	309	339	678	301	1,327	393	457	542
Napaskiak	536	1,258	759	1,569	2,201	1,412	2,935	3,091	1,647	2,227	3,446
Bethel	1,923	4,150	1,378	7,019	4,114	3,342	7,604	11,772	4,900	7,472	17,026
Kwethluk	2,692	3,763	2,329	5,050	3,262	4,538	6,135	6,889	3,549	3,187	7,932
Akiakchak	1,626	3,052	1,800	2,533	3,488	3,952	4,957	5,543	3,415	2,602	7,022
Akiak	1,865	3,159	906	2,869	2,495	1,774	3,941	3,790	1,332	1,275	3,290
Tuluksak	737	1,486	493	1,295	572	1,019	1,559	1,710	1,048	1,131	1,995
Lower Kalskag	961	571	805	2,661	710	841	1,918	1,733	1,463	2,083	2,146
Upper Kalskag	667	1,049	[7]	[7]	1,143	719	1,333	1,699	1,404	1,623	734
Aniak	1,057	688	185	602	1,104	494	2,002	1,415	467	1,406	2,136
Chuathbaluk	64	54	10	30	74	29	139	217	40	180	219
Napamute	20	16	44	52	134	2	78	60	100	19	22
Crooked Creek	747	518	561	859	1,358	363	1,249	638	77	541	684
Georgetown	[10]	[10]	[10]	[10]	[10]	[10]	12	[10]	[10]	9	2
Red Devil	[10]	40	144	228	314	[10]	182	[10]	111	142	232
Sleetmute	465	222	[9]	[9]	[9]	491	149	343	200	267	161
Stony River	435	25	31	67	299	101	632	364	191	2,187	105
Totals	20,361	30,910	14,642	37,246	29,017	27,143	49,606	57,875	30,230	40,138	69,204

Village	1971	1972	1973	1974	1975	1976	1960 1973 Average	1974 1976 Average	1977
Kwigillingok, Kipnuk Kongiganak	241	10	75	[10]	[10]	197	330	65.67	743
Eek	1,882	1,969	1,981	2,356	2,110	3,232	2,286	2,566	2620
Tuntutuliak	1,841	3,214	2,859	1,577	3,492	4,807	2,289	3,292	2470
Kasigluk	1,645	1,292	1,864	1,411	1,713	1,613	1,609	1,579	1324
Nunapitchuk	1,970	2,496	2,663	1,165	2,092	2,578	1,916	1,945	
Atmauthluak[6]	548	864	1,106	382	1,042	1,159	931	861	
Napakiak	1,868	2,009	1,763	1,224	2,864	3,330	2,719	2,473	
Oscarville	570	196	586	180	891	623	573	565	
Napaskiak	1,916	1,578	2,048	900	2,308	3,566	1,902	2,258	
Bethel	8,731	8,371	8,898	4,631	11,688	13,215	6,907	9,845	
Kwethluk	5,564	5,137	3,444	2,694	3,179	4,193	4,534	3,355	
Akiakchak	4,818	3,872	2,592	1,726	3,534	4,915	3,662	3,392	
Akiak	2,688	1,899	1,895	1,292	2,837	3,076	2,366	2,402	
Tuluksak	1,280	1,318	1,322	883	1,338	1,411	1,212	1,211	
Lower Kalskag	2,355	2,604	1,309	1,586	2,755	4,536	1,583	2,959	
Upper Kalskag	601	401	938	463	1,752	1,431	1,026	1,215	
Aniak	1,076	2,105	1,030	1,952	1,391	1,490	1,126	1,611	
Chuathbaluk	179	261	942	674	594	657	174	642	
Napamute	17	20	13	6	226	420	43	217	
Crooked Creek	291	183	269	650	238	264	596	384	
Georgetown	0	0	0	[9]	[10]	[10]	4	[10]	
Red Devil	135	182	138	205	623	195	168	341	
Sleetmute	181	69	504	269	256	356	277	294	
Stony River	2,521[11]	95	287	439	861	653[11]	524	651	
Totals	42,926	40,145	38,526	26,665	47,784	57,917	38,757	44,122	

1/ Included with other vilages.
2/ Does not include 1965
3/ Estimates based on catch data through 1969
4/ Included with Eek
5/ Does not include 1964
6/ New village of Atmau hluak segregated in 1970 from parent village of Nunapitchuk.
7/ Included with Lower Kalskag
8/ Does not include 1962 and 1963
9/ Included with Red Devil
10/ Data not available
11/ includes Lime Village

ppendix Table 14. Comparative Kuskokwim River "other salmon" subsistence catches by village, 1960-1975.[1/2/]

illage	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1960-1973 Average	1974-1976 Average
ipnuk, Kongiganak, kwigillingok	1,430[4/]	3,279[4/]	1,990[4/]	2,562[4/]	2,323	0	680	2,846	2,800	2,481	3,937	1,110	1,284	807	9/	9/	902	1,966	902
ek	4,094[4/]	2,321[4/]	2,072[4/]	1,771[4/]	3,151	2,898	1,324	1,922	3,503	3,436	4,855	2,213	783	2,401	4,227	2,754	4,425	2,625	3,802
ntutuliak	4,101	8,526	9,692	6,791	8,421	18,993	9,747	11,531	14,090	17,462	10,600	9,964	11,103	13,572	28,321	7,429	8,440	11,042	14,730
sigluk	1,400	3,657	1,705	1,020	5/	4,041	3,058	2,309	4,311	3,308	5,731	2,043	1,934	6,090	6,773	3,708	4,050	3,124	4,843
napitchuk	2,743	4,868	7,474	2,462	1,171	4,251	4,145	6,278	7,731	6,934	11,412	3,375	5,600	7,663	12,498	5,447	6,551	5,436	8,165
mauthluak											1,191	1,197	947	2,818	4,585	2,524	3,446	1,538	3,518
pakiak	19,888	5,789	6,167	3,711	12,312	12,928	9,275	12,685	12,700	12,390	16,371	4,427	5,191	8,461	21,494	11,630	9,477	10,164	14,200
carville	3,948	1,680	1,723	1,025	487	8,010	407	2,580	2,104	2,743	4,669	1,675	498	3,081	5,617	3,237	2,416	2,474	3,756
paskiak	5,199	4,286	5,546	3,584	6,275	26,206	8,743	8,585	12,409	11,655	11,169	7,039	8,858	8,478	20,467	12,930	21,518	9,145	18,305
ethel	12,972	12,845	8,470	8,623	15,623	19,099	14,011	14,055	28,603	14,613	33,475	9,905	16,885	33,930	34,892	26,808	26,970	17,366	29,223
ethluk	32,975	21,106	22,788	13,188	19,186	37,780	18,707	23,872	36,645	23,462	27,702	13,941	11,721	19,565	39,747	19,183	27,120	23,046	28,783
iakchak	15,932	12,518	10,521	6,725	10,096	25,138	15,049	13,584	19,461	10,306	29,776	12,298	9,266	9,864	15,108	14,008	16,050	14,324	15,055
iak	13,061	8,205	6,551	8,478	9,659	12,297	10,622	9,332	13,775	9,854	13,003	9,264	5,108	6,118	18,434	13,890	12,337	9,666	~~16,563~~ 14,88
luksak	19,261	7,928	8,526	10,289	9,777	12,820	11,670	8,898	11,114	6,058	7,626	5,115	5,145	5,946	13,261	7,819	11,833	9,298	10,971
wer Kalskag	11,563	7,764	16,478	23,249	9,472	21,906	10,346	16,018	8,114	8,468	11,158	3,509	3,490	2,873	12,265	9,823	17,169	11,029	13,085
per Kalskag	38,398	27,149	7/	7/	11,391	11,970	6,236	8,364	9,733	9,413	5,309	3,530	1,460	5,607	9,631	6,904	8,694	11,547	8,409
iak	36,673	15,935	10,120	10,608	17,874	11,353	12,484	16,788	17,341	15,127	10,030	4,933	5,243	13,547	9,305	9,597	13,507	14,147	10,803
uathbaluk	22,370	2,922	3,784	2,629	5,059	6,507	5,625	7,249	11,588	7,523	10,971	5,632	8,509	14,171	4,287	561	7,967	8,181	4,271
parmute	11,017	6,235	3,898	5,192	4,873	704	3,704	5,750	1,774	1,453	1,224	1,862	4,645	3,451	76	226	1,653	3,904	651
ocked Creek	41,263	17,558	27,259	23,166	32,550	18,986	19,467	14,365	12,704	6,810	9,216	3,094	3,658	1,981	4,954	2,461	3,236	16,577	3,550
orgetown	9/	9/	9/	9/	9/	9/	70	9/	2,030	3,664	800	0	0	10	9/	2/	2/	939	9/
d Devil	9/	1,350	9,007	5,367	5,706	9/	2,746	9/	2,400	1,130	2,454	1,067	1,695	2,782	2,688	4,481	4,231	3,246	3,800
eetmute	17,259	6,884	10/	10/	10/	11,707	2,611	6,875	11,218	8,258	4,464	3,203[11/]	4,293	2,168	4,212	5,767	7,628	7,176	5,867
ony River	11,750	2,642	1,855	1,110	4,254	15,865	3,933	11,377	13,875	12,080	8,407	5,995	3,000	3,875	4,328	5,202	8,484	7,144	6,004
tals	327,297	185,447	165,626	141,550	189,660	283,459	174,660	205,263	260,023	198,628	245,550	116,391	120,316	179,259	277,170	176,389	228,104	205,183	229,246

/ Catches include a majority of chum salmon but include small numbers of red, coho, pink and small king salmon.
/ 1965 to 1972 catches do not include late coho salmon catches.
/ Does not include 1965.
/ Estimate based on catch data through 1970.
/ Included with Eek.
/ Does not include 1964.
/ Included with Lower Kalskag.
/ Does not include 1962 and 1963.
/ Data not available.
/ Included with Red Devil.
/ Includes Lime Village.

2/ Did not fish

pendix Table 14. Comparative Kuskokwim River "other salmon" subsistence catches by village, 1960-1975.[1/2/]

llage	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1960-1973 Average	1974 1976 Average
pnuk, Kongiganak, Kwigillingok	1,430[4/]	3,279[4/]	1,990[4/]	2,562[4/]	2,323	0	680	2,846	2,800	2,481	3,937	1,110	1,284	807	9/	9/	902	1,966	902
k	4,094[4/]	2,321[4/]	2,072[4/]	1,771[4/]	3,151	2,898	1,324	1,922	3,503	3,436	4,855	2,213	783	2,401	4,227	2,754	4,425	2,625	3,802
ntutuliak	4,101	8,526	9,692	6,791	8,421	18,993	9,747	11,531	14,090	17,462	10,600	9,964	11,103	13,572	28,321	7,429	8,440	11,042	14,730
sigluk	1,400	3,657	1,705	1,020	5/	4,041	3,058	2,309	4,311	3,308	5,731	2,043	1,934	6,090	6,773	3,708	4,050	3,124	4,843
napitchuk	2,743	4,868	7,474	2,462	1,171	4,251	4,145	6,278	7,731	6,934	11,412	3,375	5,600	7,663	12,498	5,447	6,551	5,436	8,165
mauthluak											1,191	1,197	947	2,818	4,585	2,524	3,446	1,538	3,518
paki k	19,888	5,789	6,167	3,711	12,312	12,928	9,275	12,685	12,700	12,390	16,371	4,427	5,191	8,461	21,494	11,630	9,477	10,164	14,200
carville	3,948	1,680	1,723	1,025	487	8,010	407	2,580	2,104	2,743	4,669	1,675	498	3,081	5,617	3,237	2,416	2,474	3,756
paskiak	5,199	4,286	5,546	3,584	6,275	26,206	8,743	8,585	12,409	11,655	11,169	7,039	8,858	8,478	20,467	12,930	21,518	9,145	18,305
thel	12,972	12,845	8,470	8,623	15,623	19,099	14,011	14,055	28,603	14,613	33,475	9,905	16,885	33,930	34,892	26,808	26,970	17,365	29,223
ethluk	32,975	21,106	22,788	13,188	19,186	37,780	18,707	23,872	36,645	23,462	27,702	13,941	11,721	19,565	39,747	19,183	27,120	23,046	28,783
iakchak	15,932	12,518	10,521	6,725	10,096	25,138	15,049	13,584	19,461	10,306	29,776	12,298	9,266	9,864	15,108	14,008	16,050	14,324	15,055
iak	13,061	8,205	6,551	8,478	9,659	12,297	10,622	9,332	13,775	9,854	13,003	9,264	5,108	6,118	18,434	18,890	12,337	9,666	16,553
luksak	19,261	7,928	8,526	10,289	9,777	12,820	11,670	8,898	11,114	6,058	7,626	5,115	5,145	5,946	13,261	7,819	11,833	9,298	10,971
wer Kalskag	11,563	7,764	16,478	23,249	9,472	21,906	10,346	16,018	8,114	8,468	11,158	3,509	3,490	2,873	12,265	9,823	17,169	11,029	13,085
per Kalskag	38,398	27,149	7/	7/	11,391	11,970	6,236	8,364	9,733	9,413	5,309	3,530	1,460	5,607	9,631	6,904	8,694	11,547	8,409
iak	36,673	15,935	10,120	10,608	17,874	11,353	12,484	16,788	17,341	15,127	10,030	4,933	5,243	13,547	9,305	9,597	13,507	14,147	10,803
gathbaluk	22,370	2,922	3,784	2,629	5,059	6,507	5,625	7,249	11,588	7,523	10,971	5,632	8,509	14,171	4,287	561	7,967	8,181	4,271
pamute	11,017	6,235	3,898	5,192	4,873	704	3,704	5,750	1,774	1,453	1,224	1,862	4,645	3,451	76	226	1,653	3,984	651
oked Creek	41,263	17,558	27,259	23,166	32,550	18,986	19,467	14,365	12,704	6,810	9,216	3,094	3,658	1,981	4,954	2,461	3,236	16,577	3,550
orgetown	9/	9/	9/	9/	9/	9/	70	9/	2,030	3,664	800	0	0	10	9/	9/	9/	939	9/
d Devil	9/	1,350	9,007	5,367	5,706	9/	2,746	9/	2,400	1,130	2,454	1,067	1,695	2,782	2,688	4,481	4,231	3,246	3,200
eetmute	17,259	6,884	10/	10/	10/	11,707	2,611	6,875	11,218	8,258	4,464	3,203[11/]	4,293	2,168	4,212	5,761	7,628	7,176	5,867
ony River	11,750	2,642	1,855	1,110	4,254	15,865	3,933	11,377	13,875	12,080	8,407	5,995	3,000	3,875	4,328	5,202	8,484[11/]	7,144	6,004
tals	327,297	185,447	165,626	141,550	189,660	283,459	174,660	205,263	260,023	198,628	245,550	116,391	120,316	179,259	277,170	176,389	228,104	205,183	229,246

/ Catches include a majority of chum salmon but include small numbers of red, coho, pink and small king salmon.
/ 1965 to 1972 catches do not include late coho salmon catches.
/ Does not include 1965.
/ Estimate based on catch data through 1970.
/ Included with Eek.
/ Does not include 1964.
/ Included with Lower Kalskag.
/ Does not include 1962 and 1963.
/ Data not available.
/ Included with Red Devil.
/ Includes Lime Village.

Appendix Table 16. Comparative Kuskokwim River subsistence fishery data, 1960-1976 [4/]

Year	Fishing families surveyed	Mean numbers per fishing family					
		People	Dogs	Snow-machines [1/]	King Salmon	Other salmon [3/]	Fishwheels
1960	247	5.89	6.66		60	1,074	[2/]
1961	342	6.02	6.33		39	453	.19
1962	349	6.50	6.30		79	470	.18
1963	405	6.14	5.29		87	351	.11
1964	394	6.33	5.44		70	454	.10
1965	332	5.95	5.45		64	669	.08
1966	492	5.91	4.49		91	320	.06
1967	472	6.36	5.22	.18	106	375	.06
1968	567	6.23	5.31	.35	53	447	.06
1969	376	6.49	5.51	.53	78	385	.05
1970	514	6.33	4.65	.75	108	384	.02
1971	488	6.53	4.30	1.01	88	238	.01
1972	576	6.78	3.08	1.00	51	166	.02
1973	408	6.55	3.84	1.48	81	356	.02
1974	596	6.24	3.61	1.12	45	466	.02
1975	437	6.41	3.99	1.35	79	310	.02
1976	494	6.53	3.81	1.23	86	335	.02
1977	494	6.27	3.80	1.35	91	287	.01

1/ Snowmachine count started in 1967.
2/ Information not available.
3/ Does not include coho salmon.
4/ Unexpanded data.

Appendix Table 17. Quinhagak subsistence fishery data, 1967-1976 [1/]

Year	Total Fishing Families	Averages Per Fishing Family							
		People	Dogs	Snow-machines	King Salmon	Dog Dalmon	Coho Salmon	8 1/2" Nets	5 1/2" Nets
1967	19	6.43	4.00		71	231		.86	1.00
1968	46	5.59	4.07	.28	88	234	380	.48	.54
1969	59	5.38	3.41	.46	27	29	179	.72	.28
1970	46	6.02	2.76	.74	47	110		.64	.69
1971	41	5.83	2.37	.73	55	87	36	.54	.73
1972	54	6.41	2.30	.80	56	116	9	.44	1.00
1973	44	5.80	2.07	.98	61	98	83	1.02	.98
1974	47	5.53	2.31	1.17	46	78	87	.63	.74
1975	46	5.86	1.85	1.13	71	88		1.00	.93
1976	50	5.62	2.2	1.42	44	119		0.84	1.24
1977	60	6.63	1.58	1.42	33	70	[illegible]	[illegible]	[illegible]

1/ Expanded data.